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REPORT OF THE SECRETARY
OF THE
SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1911



(Publication 2065)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1911

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OF THE
SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

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REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT,

FOR THE YEAR ENDING JUNE 30, 1911.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit a report showing the operations of the Institution and its branches during the year ending June 30, 1911, including the work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature.

The general report reviews the affairs of the Institution proper, with brief paragraphs relating to the several branches, while the appendix presents detailed reports by those in direct charge of the work. Independently of the present report, the operations of the National Museum and the Bureau of American Ethnology are fully treated of in separate volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city of Washington, and the other four shall be inhabitants of some State, but no two of them of the same State."

On July 4, 1910, Chief Justice Fuller died and was succeeded on December 19 by Chief Justice Edward Douglass White as *ex officio* member of the board.

At a meeting of the Board of Regents on December 8, 1910, the Hon. James S. Sherman, Vice President of the United States, was elected Chancellor.

The personnel of the board has been further changed by the resignation of Hon. John B. Henderson and the appointment of John B. Henderson, jr., as a Regent.

GENERAL CONSIDERATIONS.

The Smithsonian Institution has had a powerful influence for more than 60 years in the development of science in the United States. Its achievements in many lines of research and exploration have been of great good in the promotion of the welfare of the human race. The Institution and its branches continue to be engaged in a wide range of activities, covering practically the entire field of natural and physical science, as well as anthropological and archeological researches.

In my last report I referred to the establishment of a trust fund, through the generosity of Mrs. E. H. Harriman, which yields an annual income of \$12,000, to be devoted to the definite purpose of carrying on scientific studies, particularly of American mammals and other animals, the donor specifying Dr. C. Hart Merriam as the investigator to carry on the work during his lifetime. I believe it desirable to establish a number of such research associateships, whereby especially capable men in other branches of science may be afforded opportunities for research work without the care and burden of administrative duties, and with full assurance that as long as their work is properly conducted it will be continued and that provision will be made for them when incapacitated for active service. The field for scientific investigation is extensive, and there are numbers of worthy projects that can not now be undertaken because of lack of means—projects that could not properly be carried on through Government appropriation, but which the Smithsonian Institution could readily undertake were the means available.

Friends of the Institution have from time to time generously provided funds for carrying on important explorations and researches, as in the case of the Smithsonian African expedition, and more recently by largely supporting the Smithsonian biological survey of the Panama Canal Zone.

It seems proper that I should here call special attention to the motive which led the late George W. Poore, of Lowell, Massachusetts, who died December 17, 1910, to make the Smithsonian Institution his residual legatee. By the terms of the will the estate, esti-

mated to be about \$40,000, is bequeathed under the condition that the income from this sum should be added to the principal until a total of \$250,000 should have been reached, and that then the income only should be used for the purposes for which the Institution was created. The fund will be known as the Lucy T. and George W. Poore fund. The closing words of this item of the will read as follows:

I make this gift not so much because of its amount as because I hope it will prove an example for other Americans to follow, by supporting and encouraging so wise and beneficent an institution as I believe the Smithsonian Institute to be, and yet it has been neglected and overlooked by American citizens.

ADMINISTRATION.

On account of the large increase in the administrative work of the Institution and its branches, brought about by the natural growth of their activities and the addition of new interests, it appeared advisable to appoint an additional Assistant Secretary, to have immediate charge of the Library and International Exchanges. With the approval of the Regents, I appointed to that position Dr. Frederick William True, who entered the service of the Institution in 1878 and for several years had been head curator of biology in the United States National Museum. Dr. True entered upon the active duties of his office on June 1, 1911.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of Smithsonian, 1846.....	\$515, 169. 00
Residuary legacy of Smithsonian, 1867.....	26, 210. 63
Deposit from savings of income, 1867.....	108, 620. 37
Bequest of James Hamilton, 1875.....	\$1, 000. 00
Accumulated interest on Hamilton fund. 1895.....	1, 000. 00
	<hr/>
	2, 000. 00
Bequest of Simeon Habel, 1880.....	500. 00
Deposit from proceeds of sale of bonds, 1881.....	51, 500. 00
Gift of Thomas G. Hodgkins, 1891.....	200, 000. 00
Part of residuary legacy of Thomas G. Hodgkins, 1894.....	8, 000. 00
Deposit from savings of income, 1903.....	25, 000. 00
Residuary legacy of Thomas G. Hodgkins.....	7, 918. 69
	<hr/>
Total amount of fund in the United States Treasury.....	944, 918. 69
Registered and guaranteed bonds of the West Shore R. R. Co. (par value), part of legacy of Thomas G. Hodgkins.....	42, 000. 00
	<hr/>
Total permanent fund	986, 918. 69

In addition to the above, there are four pieces of real estate bequeathed to the Institution by the late R. S. Avery, some of which yield a nominal rental and all are free from taxation.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to \$83,435.30, was derived as follows: Interest on the permanent foundation, \$58,375.12; contributions from various sources for specific purposes, \$14,518.43; and from other miscellaneous sources, \$10,541.75; all of which was deposited in the Treasury of the United States to the credit of the current account of the Institution.

With the balance of \$35,364.88 on July 1, 1910, the total resources for the fiscal year amounted to \$118,800.18. The disbursements, which are given in detail in the annual report of the executive committee, amounted to \$86,374.52, leaving a balance of \$32,425.66 on deposit June 30, 1911, in the United States Treasury.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1911:

International exchanges.....	\$32,000
American Ethnology.....	42,000
Astrophysical Observatory.....	13,000
National Museum:	
Furniture and fixtures.....	125,000
Heating and lighting.....	50,000
Preservation of collections.....	300,000
Books.....	2,000
Postage.....	500
Building repairs.....	15,000
Building.....	77,000
National Zoological Park.....	115,000
International Catalogue of Scientific Literature.....	7,500
Elevators, Smithsonian Building.....	10,000
Total.....	789,000

EXPLORATIONS AND RESEARCHES.

Various scientific explorations and researches have been carried on during the past year by the Institution as far as its limited income and the generosity of its friends would permit. There have also been important biological, ethnological, and astrophysical researches by the National Museum, the Bureau of American Ethnology, and the Astrophysical Observatory, respectively, which are discussed elsewhere in this report.

STUDIES IN CAMBRIAN GEOLOGY AND PALEONTOLOGY.

During the field season of 1910 I continued the study of the Cambrian strata of the section of the Rocky Mountains adjacent to the main line of the Canadian Pacific Railway, special attention being given to the Stephen formation. The outcrop of this formation was carefully examined for many miles along the mountain sides, with the hope of finding a locality where conditions had been favorable for the preservation of the life of the epoch. The famous trilobite locality on the slope of Mount Stephen above Field had long been known and many species of fossils collected from it, but even there the conditions had not been favorable for the presence and preservation of examples of much of the life that, from what was known of older faunas and the advanced stage of development of the Upper Cambrian fauna, must have existed in the Middle Cambrian seas. The finding, during the season of 1909, of a block of fossiliferous siliceous shale that had been brought down by a snowslide on the slope between Mount Field and Mount Wapta led us to make a thorough examination of the section above in 1910. Every layer of limestone and shale above was examined, until we finally located the fossil-bearing band. After that for 30 days we quarried the shale, slid it down the mountain side in blocks to a trail, and transported it to camp on pack horses, where the shale was split, trimmed, and packed and then taken down to the railway station at Field, 3,000 feet below.

A number of sections of the Cambrian rocks were studied and measured in the mountains north and south of Laggan, Alberta, and many beautiful panoramic photographs secured.

BIOLOGICAL SURVEY OF THE PANAMA CANAL ZONE.

At the date of my last annual report the Institution contemplated an exhaustive biological survey of the Panama Canal Zone, and it was then hoped that definite plans would soon be completed and the survey undertaken within a few months. I am glad now to report that chiefly through the generosity of friends of the Institution the necessary funds for carrying on the work became available. With the cooperation of several of the executive departments, and of the Field Museum of Natural History, a party of about 10 naturalists was accordingly sent to the zone, and the results so far accomplished have been very satisfactory. Large collections of biological material have been received, including specimens of a considerable number of genera and species new to science.

Much interest is manifest in the survey both here and in the zone. The Republic of Panama was so impressed with the importance of the work that it invited the Institution to extend the survey within

the bounds of that country, which was done with gratifying results as far as the limited means and time permitted.

As stated in my last report, it seemed to be highly important to science that such a survey of the Canal Zone be made, for, although it was known in a general way that a certain number of species of animals and plants in the fresh-water streams on the Atlantic side of the Isthmus were different from those on the Pacific side, no definite knowledge of the extent of these differences had been acquired. It also seemed important to determine exactly the geographical distribution of the various organisms inhabiting the Isthmus, which is one of the routes by which the animals and plants of South America have entered North America and vice versa. When the Panama Canal is completed the organisms of the various watersheds will be offered a ready means of mingling together, the natural distinctions as regards distribution now existing will be obliterated, and the data for a true understanding of the fauna and flora will be placed forever out of reach. Moreover, a great fresh-water lake will be created by the construction of the Gatun Dam, and the majority of the animals and plants inhabiting that locality will be driven away or drowned, and quite possibly some species may be exterminated before they become known to science.

BIOLOGICAL EXPEDITION IN CANADA.

Through the courtesy of the Canadian Government and of Dr. A. O. Wheeler, president of the Alpine Club of Canada, the Smithsonian Institution was enabled to send a small party of naturalists to accompany Dr. Wheeler on his topographical survey of the British Columbia and Alberta boundary line and the Mount Robson region. The party started in June, 1911.

The region to be surveyed includes a most rugged and broken country in the midst of the Canadian Rockies, abounding in a great variety of animals and plants, and it is expected that the expedition will result in a large and valuable collection of birds, mammals, insects, and plants to be added to the National Museum series.

RAINEY EXPEDITION IN AFRICA.

Mr. Paul J. Rainey, of New York City, having planned a hunting and collecting trip of several months' duration in Africa, offered to present to the Institution the natural history material obtained during the trip if there could be sent with him some person skilled in the preparation of specimens. Mr. Rainey generously offered to bear all the expenses of the trip. The route of travel was to be north of that of the recent Smithsonian African expedition, through the country lying between the northern portion of British East Africa and the southern part of Abyssinia. Mr. Edmund Heller, who was

one of the field naturalists of the Smithsonian African expedition under the direction of Col. Roosevelt, was accordingly detailed to accompany Mr. Rainey, and letters have been received indicating very successful results.

BIRD STUDIES IN THE ALEUTIAN ISLANDS AND BERING SEA.

A small party of naturalists made a brief visit to the Aleutian Islands and Bering Sea during the season of 1911, chiefly in the interest of the Smithsonian Institution and the Biological Survey of the Department of Agriculture, especially for a study of land and marine birds. Through the cooperation of the Treasury Department the party was afforded transportation on the revenue cutter *Tahoma*.

The principal results of the visit were the collection of a good series of all the land birds of the islands visited, including a particularly fine series of ptarmigan, and a large number of eggs, and the securing of some interesting observations on the distribution and habits of the birds of that region. These observations will be made use of by Mr. A. C. Bent, who has undertaken to complete the work on the life histories of North American birds, two volumes of which, by the late Maj. Charles Bendire, have been published by the National Museum and the Smithsonian Institution.

ANTHROPOLOGICAL RESEARCHES IN PERU.

During the summer of 1910 Dr. Aleš Hrdlička, of the National Museum, visited the great ruins of the temples and city of Pachacamac, about 18 miles south of Lima, and also the ruins and cemeteries in the district of Trujillo, Peru, where he collected upward of 3,400 crania and a quantity of other skeletal parts. A large percentage of the gathered skulls are free from artificial deformation and therefore afford a much better opportunity than previous collections for a critical study of the peoples who centuries ago occupied and congregated in these regions.

Pachacamac was a religious center, much like the Egyptian Thebes and the Mohammedan Mecca, to which pilgrims flocked from all parts of Peru. After the destruction of the Temple of the Sun by the Spaniards, the place became a desolate pile of ruins, with from 60,000 to 80,000 graves of pilgrims who had come from widely separated regions. The Valley of Chicama, near Trujillo, with the neighboring country, was the seat of the powerful people known after one of their chiefs as Chimú.

As to the importance of the material collected, Dr. Hrdlička remarks:

Peru may well be regarded, even in its present territorial restrictions, as the main key to the anthropology of South America. Due to the numbers of its ancient inhabitants, and to their far-reaching social differentiations, indi-

rating long occupancy, a good knowledge of the people of Peru from the earliest times is very desirable, and would constitute a solid basis from which it would be relatively easy to extend anthropological comparison to all the rest of the native peoples of the southern continent. Such anthropological comparisons will be greatly facilitated by the collections acquired on this expedition.

Some of the interesting results of his work are described by Dr. Hrdlička in a pamphlet recently published by the Institution.

RESEARCHES UNDER THE HODGKINS FUND.

With a view to aiding in the establishment of an international scale for the measurement of solar radiation, as mentioned in my last report, a limited grant from the Hodgkins fund has been approved for the construction, in the Smithsonian workshops, of several silver disk pyrheliometers, after the design of Mr. C. G. Abbot, Director of the Smithsonian Astrophysical Observatory.

The International Solar Union has for some time been interested in the establishment of an international standard scale of radiation, and pyrheliometers of varying types have been in use at different observatories. The desire, however, for still another simple but accurate instrument seemed general, and the Institution has been gratified to learn that, by the use of the Abbot pyrheliometer, a more exact knowledge of solar radiation and the influence of the terrestrial atmosphere upon it have been promoted.

Arrangements have been made whereby the Abbot pyrheliometer is now in use in widely separated localities. There is one in the astronomical observatory established by Harvard College at Arequipa, Peru; another in the observatory at Teneriffe; and two have been sent to the minister of agriculture in Buenos Aires for meteorological stations in Argentina. The Department of Agriculture, the Bureau of Standards, and the United States Weather Bureau in Washington are supplied with the instruments; Prof. Chistoni, of the Royal University of Naples, has installed one there, and the Imperial College of Science and Technology at South Kensington, London, has secured one. Prof. Violle, of the National Observatory of Arts and Crafts, Paris, was among the first to install one of the Abbot instruments, and one has been sent to Dr. Hellmann, director of the Royal Prussian Meteorological Institute, Berlin. The University of Toronto, Canada, the University of Wisconsin, and the Central Physical Observatory of St. Petersburg also have them, and inquiries from other institutions as to the mode of securing them are frequent, so that the establishment of the desired international standard of estimating and recording the variations of solar radiation seems to have been already aided by the use of uniform instruments in many widely separated localities.

The distinguished specialists who form the committee on award for the examination of the memoirs submitted in the Hodgkins prize competition, announced in connection with the Congress on Tuberculosis of 1908, have not yet submitted their decision. This delay is regretted by the Institution as sincerely as by the competitors, but has seemed to be unavoidable as the large number of papers presented and their technical character make it very difficult to render a prompt decision.

Then, too, it is to be remembered that, according to the terms of the competition, the successful paper is to embody an original theory or discovery for the treatment of tuberculosis, not before published, a difficult task at a time when the attention of the medical world is so generally directed to the same subject.

The Langley Memoir on Mechanical Flight, the publication of which by the Hodgkins fund of the Institution was unfortunately delayed by causes beyond the control of the Institution, was completed just at the close of the fiscal year, as mentioned on another page.

SMITHSONIAN TABLE AT NAPLES ZOOLOGICAL STATION.

The Smithsonian Institution for 18 years past has maintained a table for the use of American biologists at the Naples Zoological Station. Exceptional opportunities are there afforded for the study of marine life, and it is believed that the cause of biological science has been thereby much advanced.

The application of Dr. R. S. Williams, of Miami University, mentioned in the Secretary's Report for 1910, was approved for March and April, 1911. Dr. Williams was chiefly occupied at Naples in ascertaining the rate of growth of recent encrusting organisms, especially bryozoans, with a view to the use of this information in researches on the Richmond division of the Ordovician period. The results thus far obtained by him he considers preliminary, and he proposes to continue the same research at some future time on a float anchored in the open sea.

In addition to his work on the bryozoan fauna, Dr. Williams secured a representative collection of the jaw apparatus of the free-swimming annelids belonging to the Eunicidea and the Glyceridea.

The appointment of Dr. Sergius Morgulis, a Parker Traveling Fellow from Harvard for 1911, was approved for the Smithsonian seat at Naples for the months of May, June, and July of this year.

Dr. C. W. Hargitt, of Syracuse University, a Smithsonian appointee at Naples for three months in 1903, was accorded a second occupancy during the present year. Several papers, among which

may be mentioned "The Hydromedusae of the Bay of Naples" and "Regeneration in *Rhizostoma pulmo*," were published by Dr. Hargitt as a result of his former appointment, and a report of his work during the present year is now in hand. He mentions with appreciation the cordial welcome accorded him by the director and staff of the laboratory, and the generosity with which the facilities for his work were provided.

Two papers embodying the results of Dr. Hargitt's recent investigations have been completed since his term at Naples, and are now in course of publication in the *Journal of Experimental Zoology*.

The application of Dr. Ch. Zeleny, associate professor of zoology in the University of Illinois, was approved for one month's occupancy, to cover part of June and July, 1911. No summary of the work accomplished during this period has yet been received from Dr. Zeleny.

When the same period is selected by more than one student the earliest application is considered first, the approval of the later ones becoming necessarily dependent on the ability of the station to provide for more than one Smithsonian appointee at the same time. It should be added that the obliging courtesy shown in this connection to appointees of the Smithsonian Institution by the director of the station often permits appointments to the seat which would otherwise be impracticable.

The prompt and efficient aid of the advisory committee in examining and reporting on applications for the table is still, as it has always been, of great service to the Institution and is very thoroughly appreciated.

PUBLICATIONS.

The Smithsonian Institution and its branches distributed during the past year nearly 200,000 copies of their various publications. These were sent chiefly to libraries and learned institutions throughout the world and to a limited list of specialists in the subjects discussed. It would be impracticable, without a very great increase in the size of the editions, to meet the popular demand for copies of Smithsonian publications. In the case, however, of the publications issued by the Government bureaus under direction of the Institution, which are printed under congressional appropriations, the law provides that they may be purchased by all who desire them at a slight advance over the cost of printing by application to the Superintendent of Documents.

It is through its publications that the Smithsonian Institution performs one of its principal functions—the diffusion of knowledge. Two series of works are issued by the Institution proper at the expense of the Smithsonian funds, namely, *Smithsonian Contributions*

to Knowledge, in quarto, and Smithsonian Miscellaneous Collections, in octavo form. The editions of these series are necessarily limited in number for distribution almost entirely to a carefully selected list of libraries throughout the world, where they may be readily consulted by students and investigators. There is also issued, at the cost of Government appropriations, an annual report, in the general appendix of which is included a considerable number of papers, either original or selected from more or less inaccessible sources, reviewing the progress and present condition of the natural and physical sciences and other branches of human knowledge. Although the edition of the report is considerable, yet the supply is each year exhausted within a very short time after its publication.

Contributions to Knowledge.—The Langley Memoir on Mechanical Flight, referred to in my last report, had been put to press and was nearly ready for distribution at the close of the fiscal year. This work forms a quarto volume of over 300 pages and a hundred plates. The memoir was in preparation at the time of Mr. Langley's death in 1906 and part of it had been written by him, bringing the work down to May, 1896, the date of his demonstration that a machine heavier than air could be made to fly under its own power. The account of later experiments, from 1897 to 1903, was written by Mr. Charles M. Manly, who became Mr. Langley's chief assistant in 1898.

Miscellaneous Collections.—Twenty papers on various subjects have been added to the series of Smithsonian Miscellaneous Collections, including descriptions of a number of new species of animals obtained by the Smithsonian African expedition and the biological survey of the Panama Canal Zone, and several papers, mentioned elsewhere, giving some results of my studies and field work in Cambrian geology and paleontology, besides an interesting paper by Dr. Hrdlička on his anthropological investigations in Peru.

Smithsonian Tables.—In connection with the system of meteorological observations established by the Smithsonian Institution about 1850, a series of meteorological tables was compiled by Dr. Arnold Guyot at the request of Secretary Henry, and the first edition was published in 1852. Though primarily designed for meteorological observers reporting to the Smithsonian Institution, the tables were so widely used by physicists that it seemed desirable to recast the entire work. It was decided to publish three separate sets of tables, each containing the latest knowledge in the field which it covered, but together forming a homogeneous series. The first of the new series, Meteorological Tables, was published in 1893; the second, Geographical Tables, in 1894; and the third, Physical Tables, in 1896. In 1909 another volume was added, so that the series now comprises: (a) Smithsonian Meteorological Tables, (b) Smithsonian Geographical Tables, (c) Smithsonian Physical Tables, and (d)

Smithsonian Mathematical Tables. Each of these works has been published in revised editions, with such corrections and additions as became necessary by the advance of scientific knowledge.

The years that had elapsed since the publication of the first edition of the Physical Tables in 1896 had brought such changes in the material upon which these tables must be based that it became necessary to almost wholly recast the work for the fifth revised edition, which was published during the past year. Recent data and many new tables have been added, including several mathematical tables especially computed for this work, which forms a volume of about 350 pages.

Opinions on Zoological Nomenclature.—As stated with some detail in my last report, the Institution cooperates with the International Commission on Zoological Nomenclature by providing clerical assistance for its secretary and by the publication of the commission's opinions. During the past year two pamphlets were issued containing opinions 1 to 25 and 26 to 29, covering important questions of nomenclature that had been matters of discussion among zoologists. In connection with the summary of each opinion there is printed a statement of the case and the discussion thereon by members of the commission. The rules to be followed in submitting cases for opinion¹ as laid down by the commission are as follows:

(1) The commission does not undertake to act as a bibliographic or nomenclatural bureau, but rather as an adviser in connection with the more difficult and disputed cases of nomenclature.

(2) All cases submitted should be accompanied by (a) a concise statement of the point at issue, (b) the full arguments on both sides in case a disputed point is involved, and (c) complete and exact bibliographic references to every book or article bearing on the point at issue.

The more complete the data when the case is submitted the more promptly can it be acted upon.

(3) Of necessity, cases submitted with incomplete bibliographic references can not be studied and must be returned by the commission to the sender.

(4) Cases upon which an opinion is desired may be sent to any member of the commission, but—

(5) In order that the work of the commission may be confined as much as possible to the more difficult and the disputed cases, it is urged that zoologists study the code and settle for themselves as many cases as possible.

Harriman Alaska series.—The Institution has received from Mrs. Edward H. Harriman several thousand copies of volumes descriptive of the results of the Harriman expedition to Alaska in 1899. The expedition was organized in cooperation with the Washington Academy of Sciences, but entirely at the expense of Mr. Harriman. He invited as his guests 3 artists and 25 men of science representing various branches of research. The expedition sailed from Seattle

¹ Cases should be forwarded to the secretary of the commission, Dr. Ch. Wardell Stiles, U. S. Hygienic Laboratory, Washington, D. C.

on May 30, 1899, on a special steamer, and was gone about two months, visiting the Aleutian Islands, the Pribilof Islands, and the Eskimo settlements on the Asiatic and American shores. The journey was extended through Bering Strait and return, and covered 9,000 miles. Large and important collections were made of mammals, birds, insects, marine animals, fossil shells, and fossil plants. Studies were also made of the great glaciers and of the geological formations of the regions visited. The contents of the volumes received by the Institution are enumerated by the editor in the appendix to the present report. The series consists of 11 volumes, printed and illustrated in the best manner. These books, now known as the Harri-man Alaska Series of the Smithsonian Institution, have been distributed, under special Smithsonian title pages, to a selected list of libraries throughout the world, the few copies of certain volumes remaining after such a distribution being held for sale in accordance with the terms of the agreement.

Museum publications.—The National Museum published its annual report, two volumes of proceedings and several bulletins, covering the usual wide range of subjects, but chiefly pertaining to zoology and botany.

Ethnological publications.—The Bureau of American Ethnology issued several bulletins, including part 2 of the Handbook of American Indians North of Mexico; part 1 of the Handbook of American Indian Languages; Antiquities of Central and Southeastern Mississippi Valley; Antiquities of the Mesa Verde National Park, and bulletins on other ethnological subjects.

Publications of historical and patriotic societies.—Annual reports of the American Historical Association and the National Society of the Daughters of the American Revolution were as usual communicated to Congress in accordance with law.

Advisory committee on printing and publication.—The committee on printing and publication has continued to examine manuscripts proposed for publication by the branches of the Institution, and has considered various questions concerning public printing and binding. Twenty-four meetings of the committee were held during the year and 115 manuscripts were passed upon. The personnel of the committee is as follows: Dr. Frederick W. True, Assistant Secretary of the Smithsonian Institution, chairman; Mr. C. G. Abbot, Director of the Astrophysical Observatory; Mr. W. I. Adams, disbursing officer of the Smithsonian Institution; Dr. Frank Baker, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Smithsonian Institution; Mr. F. W. Hodge, ethnologist in charge of the Bureau of American Ethnology; Dr. George P. Merrill, head curator of geology, United States National Museum;

and Dr. Leonhard Stejneger, head curator of biology, United States National Museum.

Allotments for printing.—The allotments to the Institution and its branches, under the head of "Public printing and binding," during the past fiscal year, aggregating \$72,700, were, as far as practicable, expended prior to June 30. The allotments for the year ending June 30, 1912, aggregating \$72,900, are as follows:

For the Smithsonian Institution, for printing and binding annual reports of the Board of Regents, with general appendixes.....	\$10,000
For the annual reports of the National Museum, with general appendixes, and for printing labels and blanks, and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half turkey or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum library.....	34,000
For the annual reports and bulletins of the Bureau of American Ethnology and for miscellaneous printing and binding for the bureau....	21,000
For miscellaneous printing and binding:	
International exchanges.....	200
International Catalogue of Scientific Literature	100
National Zoological Park	200
Astrophysical Observatory.....	400
For the annual report of the American Historical Association.....	7,000
Total.....	72,900

LIBRARY.

The libraries of the Smithsonian Institution and of its several branches show an increase of about 18,000 volumes and pamphlets during the last year, being largely additions to the National Museum library and the Smithsonian deposit in the Library of Congress.

During the last five years improved methods and consolidation of work have been adopted in the interest of economy and efficiency, as discussed by the Assistant Secretary in the appendix to this report.

The library of the Bureau of Ethnology has been transferred from its former quarters in a rented building to the galleries of the main hall in the Smithsonian Building where it is much more convenient for reference, though the books are still arranged on temporary wooden shelves. It is hoped that this hall, which was originally planned for library purposes, may in the near future become available for such use. It is proposed, if necessary funds become available, to remove the wooden galleries, stairways, window sashes and frames, and book cases in this hall and substitute fireproof bookstacks, stairways, and windows. The new stacks and cases would accommodate the books belonging to the several bureaus under the direction of the Institution, including a part of the library of the National Museum, which should be kept in a central location. They would also provide a safe place to assemble the

Smithsonian books constantly used by the bureaus, of which several thousand are now scattered through various rooms in the Smithsonian Building.

LANGLEY MEMORIAL TABLET.

The memorial tablet authorized by the Regents to be erected in the Smithsonian building commemorative of the aeronautical work of the late Secretary Langley has not yet been completed. A design for the tablet has, however, been prepared and is under consideration by the committee appointed for the purpose.

INTERNATIONAL CONGRESSES AND CELEBRATIONS.

The Institution each year receives invitations to numerous scientific congresses and celebrations in the United States and abroad, but as funds are not available for the expenses of delegates few of these invitations can be accepted. In some instances, however, it is possible to arrange for representation by collaborators of the Institution who are visiting the localities on official or private business.

Congress of Americanists.—Dr. Aleš Hrdlička was appointed representative of the Smithsonian Institution and the National Museum and delegate on the part of the United States at the second session of the Seventeenth International Congress of Americanists, held in the Museo Nacional, Mexico City, September 8 to 14, 1910. He presented an account of his recent explorations in Peru, and also described the uncovering of an especially interesting sepulchre which he had been invited by the Mexican authorities to open in the ancient ruins of San Juan Teotihuacan.

The meeting was held in the Museo Nacional, and was well attended, especially by scientific men from the United States.

Dr. C. W. Currier, of Washington, was also designated delegate of the United States and a representative of the Smithsonian Institution at the above congress.

International American Scientific Congress.—Mr. Bailey Willis, as delegate on the part of the Smithsonian Institution, attended the International Scientific Congress which was held at Buenos Aires, Argentina, July 10 to July 25, 1910.

Geological Congress.—In August, 1910, the Eleventh International Geological Congress met in Stockholm. Dr. George F. Becker, of the United States Geological Survey, was a delegate on the part of the Smithsonian Institution. The congress was more largely attended than any of its predecessors, and nothing could exceed the hospitality of its reception. The principal subjects of discussion were the distribution and extent of the iron ore deposits of the world, Cambrian paleontology, and the change of climate since the last maximum of glaciation. To all of these subjects painstaking

contributions were made from every quarter of the globe, and the publications of the congress contain the most authoritative exposition of the present state of knowledge on these vital questions. Among the papers presented to the congress was one expressing my view on "the abrupt appearance of the Cambrian fauna."

Zoological Congress.—The Seventh International Zoological Congress was held at Graz, Austria, in August, 1910. The delegates on the part of the United States and the Smithsonian Institution and National Museum were Dr. H. H. Field, Dr. W. R. Kellicott, Dr. Ch. Wardell Stiles, and Mr. Austin H. Clark. About 600 members were present at this congress, of whom about 60 were from the United States, the majority of these representing scientific societies or educational institutions. To facilitate its labors, the congress was divided into sections, each section representing a definite subject or group of subjects. Papers of general interest were read in the Stephanien-salle, a large hall in the center of the city, while papers of more restricted scope were presented in the various lecture rooms of the university. Taken as a whole, the papers read were of a distinctly progressive nature, the authors, especially the younger ones, showing a marked disposition to depart from the time-honored and accepted lines of work and thought, and to approach their subjects from entirely new view points.

Congress of Bibliography and Documentation.—Mr. Paul Brockett, assistant librarian of the Institution, who was appointed a delegate to the International Congress of Bibliography and Documentation at Brussels, August 25 to 27, 1910, attended the congress and submitted a report on its proceedings, which is printed in the appendix.

Congress of Archivists and Librarians.—An International Congress of Archivists and Librarians was held at Brussels August 29 to 31, 1910, when the Institution was represented by Mr. Paul Brockett, whose report appears in the accompanying appendix.

MISCELLANEOUS.

Hambach collection of fossils.—The Institution has secured from Dr. Gustav Hambach, of St. Louis, a collection of about 20,000 specimens of fossil echinoderms and other animals, with more than 100 types. Almost all the fossils were collected in the Mississippi Valley and are the choicest obtainable. The series of Blastoids, a group of fossil echinoderms, is unique. The collection contains representatives of the various classes of animals, among which may be mentioned many insects from the Cenozoic formation in Colorado; many specimens of Paleozoic fishes, including an especially interesting series of teeth and spines; a complete series of fossil sea-urchins; the jaws of a Carboniferous batrachian over a foot long, and of a mastodon.

Chinese photographs.—The Institution has received a valuable series of large photographic negatives taken by Mr. Bailey Willis in connection with his geological work in China. These photographs represent scenery, particularly landscapes in which the loess formation is conspicuous, and also Chinese buildings, monuments, and the people themselves. The route of the expedition through the Provinces of Chihli, Shansi, and Shensi led through the district of the loess formation and some remote mountain regions of great interest and scenic beauty. Copies of many of these photographs have been furnished at cost to various institutions for educational purposes.

NATIONAL MUSEUM.

The most important item of interest in connection with the National Museum during the year was the completion on June 20, 1911, of all structural work on the new building, just six years after the excavations for the foundation were commenced. On another page the Assistant Secretary in charge of the Museum mentions the very superior character of the building for museum purposes. It is massive and imposing in appearance. It is well lighted. There is little room that can not be utilized. More than one-half of the 10 acres of floor space is placed at the service of the public in the interest of popular education, while the remaining space is used for reserve collections and laboratories of the scientific departments and divisions and for the maintenance of the building and the operation of the heating, lighting, and ventilating plant. The greater part of the natural-history collections, including ethnology, have been removed to the new structure; while in the old building space is now afforded for the proper display of objects pertaining to the arts and industries, including the collection illustrating the graphic arts and the art textiles, and also for the large and interesting series illustrative of American history. Although there has as yet been no formal dedication of the new building, the exhibition halls are being opened to the public one after another as the reinstallation of the exhibits progresses. It is planned in the near future to admit visitors to the new building, for a portion of the day at least, on Sundays in order that the people of Washington may be afforded a long-desired opportunity to study the national collections in their leisure hours.

The number of visitors to the new building during the year was 151,112 and to the old building 207,010.

The auditorium in the new building has been utilized for meetings of various scientific bodies and important lectures. The First American International Humane Congress was held there from October 10 to 15, 1910, and in connection therewith an interesting exhibit was displayed.

The accessions received by the Museum during the year include more than 200,000 specimens of animals and plants, besides 6,600 specimens relating to geology and paleontology, and about 17,000 anthropological objects. To the National Gallery of Art were added 94 paintings and engravings. In addition, about 1,600 objects of art and anthropology were accepted by the Museum as loans for exhibition. Among important accessions that merit special mention was a collection of 3,400 ancient crania, 6,000 bones, and 1,500 archeological objects, gathered chiefly in Peru by Dr. Hrdlička, as mentioned on another page. Other interesting archeological objects were received from the ancient pueblos of Arizona and New Mexico, besides a valuable series of skulls and skeletons from Arkansas and Mississippi. About 50,000 specimens of mollusks, collected in Alaska by Dr. William H. Dall between the years 1871 and 1899, were received during the year, together with many thousands of Japanese mollusks from the Imperial University of Japan.

Many other interesting accessions of objects of zoology, botany, geology, and anthropology are referred to by the Assistant Secretary in his report.

The paintings of the National Gallery of Art, exhibited in the middle hall of the new building, continue to attract much public attention. Mr. William T. Evans has added 13 canvases to his notable gift, which now comprises 127 pictures, representing 90 contemporary American painters.

Mr. Charles L. Freer has also added a large number of objects of oriental art to his most important gift to the Nation, the entire collection remaining, however, in his keeping at Detroit, Mich.

The great exhibition halls of the new building will afford opportunity for the proper display of the national collections illustrative of natural history, and especially such large and striking objects as groups of mammals, skeletons of fossil vertebrate animals, and groups representing the habits and customs of the races of mankind. The collections pertaining to the ethnology of America had increased year by year so rapidly in extent that they long ago outgrew the space that could be allotted to them in the old building. In the new structure they are installed with adequate regard to their size and importance.

The loan collection of laces and other art textiles has been largely increased numerically and in variety of contents under the able supervision of Mrs. James W. Pinchot, who initiated the movement.

The Museum has continued the distribution of collections of duplicate specimens to schools and colleges throughout the country. About 3,000 specimens, chiefly recent and fossil animals, were thus distributed during the year, and about 23,500 duplicate specimens were used in making exchanges.

Considerable progress has been made in arranging the large quantities of natural-history specimens collected by the Smithsonian African expedition and the Smithsonian biological survey of the Panama Canal Zone. Some of the African mammals of greatest public interest have been mounted in groups.

BUREAU OF AMERICAN ETHNOLOGY.

The Bureau of American Ethnology has been engaged for a number of years in scientific studies of the American aborigines, including their arts and industries, government, religious and sociological systems, and languages, as well as their mental and physical characteristics, their history, and antiquities. Much has been accomplished in this direction, and many of the results have been permanently recorded and disseminated by means of publication; but a large body of material still awaits final study and arrangement, and much work remains to be done both in the field and in the office.

The investigations of the bureau have, however, reached a stage at which it has been found possible to summarize some of the results in the form of handbooks, designed especially for the use of schools and unprofessional students. The demand for those already issued, or about to be published, is very large. Many changes are taking place among the Indians, owing to their advance in civilization, and for that reason the researches are being pressed with all possible speed while knowledge of primitive conditions is still available. The Indians form one of the great races of mankind, and the world properly looks to our Government to gather and record accurate knowledge of this branch of the human family, while by many the work of the Bureau of American Ethnology is regarded as the basis of American history.

One of the immediate demands upon the bureau is vigorous activity in the exploration and preservation of antiquities, especially in Arizona, Colorado, and New Mexico, before these important and most interesting ruins are entirely destroyed by vandalism or the elements.

Another important work that should speedily be undertaken is an ethnological study of the Indians and Eskimo of Alaska before the advent of greater numbers of white people shall have so modified them as to destroy their primitive character. So also there is need of further activity in the study of the few survivors of Indian tribes in the Middle West.

The bureau has conducted various lines of field work among the tribes which composed the Creek Confederacy of the Southern States; the Tewa Indians of the Rio Grande Valley, New Mexico;

the Winnebago Indians of Wisconsin and Nebraska; the Piegan, Blackfeet, Cheyenne, and Menominee Indians of the Algonquian family; the Chippewa Indians, especially with reference to their music; the Osage Indians, now in Oklahoma, and the Iroquois in New York.

A study of the past and present population of the Indians, with the various causes of their decrease is being conducted.

Some very interesting studies were made in Cuba, indicating that the western end of the island, including the Isle of Pines, was once inhabited by a cave-dwelling people of low culture and without agriculture. It is believed that these people were in that condition at the time of the visit of Columbus, and that they were the survivors of a cave-dwelling population once occupying all of Cuba and represented in Porto Rico and elsewhere in the West Indies.

The Smithsonian Institution, through its Bureau of American Ethnology in cooperation with the Archaeological Institute of America, has carried on excavations in prehistoric cliff dwellings and pueblo ruins in New Mexico. In one locality these dwellings extend along the walls of a canyon for about 2 miles. In cooperation with the Colorado Cliff Dwellers' Association, the Institution excavated and repaired the celebrated Balcony House in Colorado. Excavations have also been made in newly discovered cliff dwellings and other archeological remains in northwestern Arizona.

INTERNATIONAL EXCHANGES.

An idea of the magnitude of the work conducted by this branch of the Institution may be obtained from the statement that 228,698 packages were handled during the year, an increase over the number for the preceding 12 months of 7,073. The weight of these packages was 560,808 pounds, a gain of 76,124 pounds.

The total available resources for carrying on this work were \$36,954.99, \$32,200 of which was appropriated by Congress, and \$4,754.99 was derived from the exchange repayments to the Institution.

Several changes made during the year in the routine of the Exchange Office have resulted in a more economical and efficient administration of the service.

It was stated in the last report that the German authorities had under consideration the founding in Berlin of an establishment to promote cultural relations between Germany and the United States, and that one of its functions would be to conduct on behalf of Germany the international exchange of publications which the Smithsonian Institution carries on for the United States. This establishment, which is known as the Amerika-Institut, was organized in the fall of 1910 and the exchange duties were assumed by it on January

1, 1911. The exchange agency maintained by the Smithsonian Institution in Leipzig was discontinued on the latter date.

Packages for Luxemburg and Roumania have heretofore been distributed through the Leipzig agency. Since its discontinuance the Amerika-Institut has been good enough to assume charge of the distribution of packages in Luxemburg, and the Academia Romana at Bucharest has been asked to act as the Roumanian exchange intermediary.

The Japanese Government has transferred the exchange agency of that country from the Department of Foreign Affairs to the Imperial Library at Tokyo. The regular series of United States official documents, which had been sent to the former for a number of years, has also been deposited in the Imperial Library.

The Government of the United Provinces of Agra and Oudh, Allahabad, India, has, at its request, been listed to receive a partial set of United States official publications, the total number of such depositories being now 34. The number of depositories of full sets of governmental documents remains the same as at the close of last year, namely, 55.

The Governments of the Argentine Republic, Denmark, and Great Britain have entered into the immediate exchange of their parliamentary record during the past year, 29 countries now taking part in this exchange with the United States.

Important collections of foreign publications have, through the efforts of the Exchange Office, been obtained during the past year for the Library of Congress and for several other establishments of the Government.

NATIONAL ZOOLOGICAL PARK.

The accessions to the Zoological Park during the past year were 335 animals, and the total number of animals on hand June 30, 1911, was 1,414, representing 376 species of mammals, birds, and reptiles, about 20 species being new to the park.

Among the important additions to the collections I may mention a pair of northern fur seals from Alaska, a hippopotamus, an East African buffalo, three prong-horn antelopes, a pair of reindeer, and a large Asiatic macaque monkey.

The number of visitors was 521,440, or a daily average of 1,428. As an indication of the educational value of the park, it may be mentioned that it was visited by 169 schools, classes, etc., with 4,966 pupils, an increase of about a thousand over the year preceding. While most of the classes were from the District of Columbia, some of them belonged in various parts of the country, including all the New England States, New York, Pennsylvania, and North Carolina.

The equipment of the Zoological Park, both as regards the accommodations for the collections and facilities for visitors, is still inadequate and is inferior to that of other establishments of the kind of equal importance.

Many of the animals are kept in temporary quarters that are insufficient in size, more or less insanitary, and quite costly to maintain. This is particularly true of the fine series of birds, which includes some of exceptional interest and rarity. The rough temporary building in which they are now kept is too small for the exhibition of the entire collection and the conditions are such that it is difficult to keep the birds in a good state of health. In a suitable structure the bird collection would be one of the most attractive features of the park.

Permanent paddocks are also needed for the hardy deer, wild sheep, goats, and cattle, which are now scattered in temporary inclosures, some of them altogether unsuitable.

A new bridge across Rock Creek is urgently needed to replace the present temporary log structure, and it should be of a permanent character and sufficiently wide to provide for the greatly increased travel when the valley of Rock Creek is fully developed.

The roadways and walks in the park were greatly improved at the cost of a special appropriation for that purpose. Nearly a mile of the roads were treated either by reshaping and supplying a top layer of stone or by regrading and furnishing the entire thickness of road-bed metal. About $1\frac{1}{4}$ miles of walks were also laid or repaired and steps were constructed where grades had before been too steep. A considerable amount of work was also done to provide proper drainage.

ASTROPHYSICAL OBSERVATORY.

The Astrophysical Observatory has been engaged in three principal lines of work during the year.

Observations by the spectrobolometric method were continued in order to confirm the view referred to in last year's report that the determinations of the intensity of the solar radiation outside the earth's atmosphere are independent of the observer's altitude above sea level, provided the conditions are otherwise good. Observations for the "solar constant" were accordingly taken on Mount Whitney in the summer of 1910, where opportunity was afforded also for measurements of the brightness of the sky by day and by night, the influence of the water vapor on the sun's spectrum, and the distribution of the sun's energy spectrum outside the atmosphere. The results of these observations show no discrepancy due to altitude between Mount Wilson (5,840 feet) and Mount Whitney (14,502 feet).

It also seemed important to confirm by further observation the variability of the solar constant of radiation. Observations were accordingly continued daily at Mount Wilson until November 10, 1910,

and renewed again on June 11, 1911, which tend to confirm the conclusion that the sun's output of radiation varies from day to day in a manner irregular in period and quantity. Assurance seems now complete that this latter result will be tested during the next fiscal year by long-continued daily observations taken simultaneously at two widely separated stations, where the atmosphere is believed to be specially favorable for such research. The definite determination of the laws governing the apparent variability of the "solar constant" it is expected will be of much value in the probable forecast of climatic conditions from year to year.

Measurements have also been made of the transparency, for long wave radiation, of columns of air containing known quantities of water vapor. This line of research promises highly interesting results.

As mentioned on another page, arrangements have been made with several observatories, widely separated through the world, for the use of the standard silver-disk secondary pyrheliometer designed by the director of the Smithsonian Astrophysical Observatory. It is hoped to thus secure not only uniformity of radiation measures, but also a more exact knowledge of solar radiation and the influence of the terrestrial atmosphere upon it.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The International Catalogue of Scientific Literature publishes, through the cooperation of countries in all parts of the world, a current classified index to the literature of science. Seventeen volumes have been published annually, beginning with the literature of 1901. The organization consists of a central bureau in London and regional bureaus established in and supported by the 32 countries taking part in the enterprise. Supreme control of the catalogue is vested in an international convention, which met in London July, 1905, and July, 1910, and is to meet every tenth year hereafter. The second international convention met in London at the rooms of the Royal Society on July 12 and 13, 1910, and Mr. Leonard C. Gunnell, assistant in charge of the United States regional bureau, was sent by the Institution as the delegate from the United States. The convention decided that on account of the success already achieved by the International Catalogue and the great importance of the objects promoted, the enterprise would be continued. Attention was called to the urgent need of a permanent fund to aid in carrying on and extending the work. It was pointed out that although various regional bureaus for the collection of material were supported by the countries in which they were located, the maintenance of the central bureau for general administration and actual publication of the 17 annual volumes was dependent entirely on the funds derived from the sub-

scribers to the published volumes. Though every care has been used to edit and publish the work in the most economical way, the income of the central bureau has proved to be insufficient to meet current expenses and in addition pay interest on approximately \$35,000 of borrowed capital.

As a more detailed report of the work of the bureau and of the proceedings of the convention will be found in the appendix to this report, it will be sufficient here to call attention to the great value and importance of the work, and to say that it would be difficult to find an enterprise more deserving of endowment. A capital fund, yielding an annual income of from \$5,000 to \$10,000, would enable the central bureau not only to broaden the scope of the catalogue but also to reduce the subscription price now charged for the annual volumes. This charge is \$85 per year which, although not large when the amount of matter published is considered, is found to be far beyond the means of many who would otherwise be glad to avail themselves of this important aid to scientific research.

The Smithsonian Institution has a peculiar interest in the International Catalogue, for the reason that the original idea was conceived by the first Secretary of the Institution in 1855. The Royal Society through its Catalogue of Scientific Papers later partly carried out Secretary Henry's idea. Experience proved that the enterprise was too great for any one society, or, indeed, any one nation, to undertake, and the Smithsonian Institution, representing the United States, joined in the movement to make the work international.

The history of this international movement is briefly as follows:

The British foreign office in 1894, at the instance of the Royal Society, requested the United States Government, through the Department of State, to send delegates to a conference to be held in London in 1896. The matter was referred to the Smithsonian Institution, and the late Prof. Simon Newcomb and Dr. John S. Billings were sent as delegates. The second conference was held in 1898, and Dr. Cyrus Adler, librarian of the Smithsonian Institution, attended as a delegate.

In 1901, when success or failure depended on obtaining the cooperation of the United States in the enterprise, the Smithsonian Institution agreed to and did support a regional bureau from that time until 1906, when Congress made its first annual appropriation to carry on the work in this country. It will thus be seen that in each step the United States has, through the Smithsonian Institution, been prominent in the movement, and it would be a matter of much gratification if now that the enterprise has been so auspiciously started it could be further aided by an endowment fund originating in this country.

NECROLOGY.

MELVILLE WESTON FULLER.

It becomes my duty to record here the death of Chief Justice Melville Weston Fuller, Chancellor of the Smithsonian Institution, who was born at Augusta, Maine, February 11, 1833, and died at his summer home, Sorrento, Maine, July 4, 1910. For 22 years prior to his death, Chief Justice Fuller had been deeply interested in the welfare of the Institution, and only on one occasion was he absent from a meeting of the Regents during the entire period of his service as a member of the board.

During his long and useful life Justice Fuller served his country faithfully in several civil offices of trust and as Chief Justice of the Supreme Court of the United States. His achievements as a jurist were most adequately portrayed by the resolutions and eulogies pronounced in his memory at a meeting of members of the bar of the Supreme Court on December 10, 1910, and at the session of the Supreme Court on January 3, 1911.

The Board of Regents of the Smithsonian Institution expressed their sorrow in the following words of tribute adopted at the annual meeting of the board on December 8, 1910:

Whereas the Board of Regents of the Smithsonian Institution have received the sad intelligence of the death, on July 4, 1910, of Melville Weston Fuller, Chief Justice of the United States, and for twenty-two years chancellor of the Institution: Therefore be it

Resolved, That we desire here to record our profound sorrow at the severing of the tie that has bound us to him for so long a period of honored service; that we feel keenly the loss of a wise presiding officer, whose vast store of learning and gracious dignity have proved so invaluable in the deliberations of this board, and whose loyal interest in the Smithsonian Institution has been a source of inspiration to his colleagues.

Resolved, That we share in the grief of the Nation at the passing away of one who was at once a distinguished leader of the greatest legal tribunal of our land, an eminent jurist, a patriotic citizen, a shining example of Christian gentleness, and who also possessed so charming a personality as a man and as a friend.

Resolved, That we respectfully tender to the members of the family of our late associate our sincerest sympathy in their great bereavement.

Resolved, That an engrossed copy of these resolutions be transmitted to the family of the late chancellor.

Respectfully submitted,

CHARLES D. WALCOTT, *Secretary*.

APPENDIX I.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the operations of the United States National Museum for the fiscal year ending June 30, 1911:

COMPLETION AND OCCUPATION OF THE NEW BUILDING.

It is gratifying to be able to report the completion of all structural work on the new building for the Museum on June 20, 1911, just six years after the excavations for its foundations were commenced. While the time limit originally estimated was somewhat exceeded on account of delays in the fulfillment of certain contracts, the work was purposely conducted slowly in order to insure entire stability and permanency of construction, which it is confidently believed have been secured. The building is massive and imposing in appearance, a notable addition to the group of Government structures at the Capital, and has already been proved to be admirably adapted to the purposes for which it was designed.

There is comparatively little room in the building that can not be utilized. Of the approximately 10 acres of floor space which it contains, fully one-half has been allotted to the public in the interest of popular education. The other half, after deducting the area required for the maintenance and operation of the building, is assigned to the storage of the reserve collections and to the laboratories. The occupation of the building did not await its final completion, but was begun during the summer of 1909, and has been continued as rapidly as the necessary furniture could be provided.

The work done on and in connection with the building during last year comprised the finishing of the rotunda, the south approaches, and the auditorium; the painting of the interior plastered walls and ironwork; and, under the direction of the officer in charge of public buildings and grounds, the grading and sodding of the grounds immediately surrounding the building and the construction of roads and walks leading to the several entrances.

By the close of the year essentially all of the reserve collections and all of the laboratories of the several divisions of anthropology, zoology, geology, and paleontology had been established in the new building, as had also most of the administrative offices which are to be located there. The collections had, moreover, been nearly all arranged in a manner convenient for study and reference, and in greater part had received their permanent systematic installation. Much remains to be done, however, in perfecting this arrangement and in completing the catalogues and indexes.

The exhibition collections had also been moved with the exception of the American mammals, the birds, the marine invertebrates, the osteological specimens, the fossil plants, the building stones, the gems, and a small section of ethnology. The only public installations that had been completed in the new building, besides the paintings of the National Gallery of Art, were, however, of ethnology, which occupied the sides and ends of the middle hall on the

main floor, and most of the two adjacent ranges. To these halls in greater or less part the public had been admitted from March 17, 1910, when the building was first opened. Work was actively progressing in the preparation of the exhibits for all of the other branches, the delays being due in large measure to the slow rate at which furniture was supplied, and had been well advanced for archeology, mineralogy, and the fossil vertebrates.

ADDITIONS TO THE COLLECTIONS.

The permanent acquisitions received during the year comprised approximately 228,642 specimens and objects, of which 204,540 were of animals and plants, 6,647 were geological and paleontological, 17,361 belonged to the several divisions included in the department of anthropology, and 94 were paintings and engravings presented to the National Gallery of Art. In addition, 1,629 objects of art and anthropology were accepted as loans for exhibition.

One of the most important accessions of the year resulted from an investigation in Argentina, conducted under the auspices of the Smithsonian Institution by Dr. Aleš Hrdlička, curator of physical anthropology, partly in conjunction with Mr. Bailey Willis as geologist, for the purpose of determining the nature and value of the evidence relating to man's antiquity in that country. The skeletal and archeological remains attributed to early man or his forerunners preserved in the museums were studied, the more important localities where such remains have been discovered were visited, and on the journey to and from Argentina short stops were made in Brazil, Peru, Panama, and Mexico. Some 3,400 ancient crania, 6,000 long and other bones, and 1,500 archeological objects of human manufacture composed the collection brought to Washington. A large number of prehistoric utensils, implements, ornaments, examples of weaving, etc., obtained by Dr. J. W. Fewkes during excavations in the Navaho National Monument and at the ancient Hopi pueblo of Wukoki at Black Falls, Little Colorado River, Ariz., were transferred by the Bureau of American Ethnology. Collections of a similar character, but including ancient human crania and skeletons, from the north-eastern pueblo region of New Mexico, were received from the School of American Archæology of the Archæological Institute of America, at Santa Fe, and a valuable series of skulls and skeletons from Arkansas and Mississippi was presented by Mr. Clarence B. Moore.

Two interesting ethnological collections, one from Liberia the other from Abyssinia, were lent for exhibition by Mr. George W. Ellis, jr., and Mr. Hoffman Philip, respectively, and a number of specimens relating to the Indians of North America were acquired by gift and purchase.

The final shipments from the Smithsonian African expedition, which arrived in the early part of the year, contained several thousand specimens of mammals, birds, reptiles, fishes, and mollusks. The notable collection of mammals belonging to Dr. C. Hart Merriam and consisting of about 5,800 skins, 6,000 skulls, and 100 complete skeletons, was secured through the generosity of Mrs. Edward H. Harriman, of New York, by whom it was purchased and donated to the Institution. The other principal additions of mammals were from British East Africa, Abyssinia, and China; while of birds the more important contributions were from North and Central America, the Philippine Islands, and China. The United States Biological Survey and the United States Bureau of Fisheries transmitted many reptiles from various parts of the United States and Mexico, and the latter also an interesting series from the Philippines. The fishes received were mainly from explorations by the Bureau of Fisheries in the eastern part of the United States. Large numbers of

insects were deposited by the Bureau of Entomology, and important collections of hymenoptera were presented by Mr. S. A. Rohwer and Mr. P. R. Myers.

An especially noteworthy accession consisted of the collection of mollusks made in Alaska by Dr. William H. Dall while in the field for the United States Coast and Geodetic Survey, and later for the United States Geological Survey, between 1871 and 1899. It comprises about 15,000 lots and 50,000 specimens, and is undoubtedly the largest collection of the shells of moderate depths of water that has ever been assembled from that region. Another extensive contribution of mollusks, consisting of many thousands of Japanese specimens, was obtained from the Imperial University of Tokyo. Important type collections, recently described, of isopod crustaceans, medusæ, hydroids, and siphonophores, from explorations by the steamer *Albatross* in the Pacific Ocean and at the Philippine Islands, were transferred by the Bureau of Fisheries. Decapod crustaceans, representing a large number of species, were received from the Indian Museum at Calcutta; many isopods from several French explorations, including the Charcot expedition to the Antarctic Ocean, were obtained from the Muséum d'Histoire Naturelle at Paris; and an interesting series of recent crinoids was secured from the Zoological Museum at Copenhagen.

The collection of plants was increased by over 38,000 specimens, of which the largest contributions were from the biological survey of the Panama Canal Zone and the Department of Agriculture, though many specimens were obtained from the Bureau of Fisheries, and by gift and exchange. On the biological survey of the Canal Zone, which is being carried on under the auspices of the Smithsonian Institution, the Museum was represented during the year by one member of its staff, Mr. W. R. Maxon, assistant curator of plants. Mr. Maxon spent about two and one-half months in the field, working in conjunction with Mr. Henry Pittier, who is in charge of the botanical investigations, and in view of the richness of the region the exploration yielded exceedingly important results. Dr. J. N. Rose, associate curator of plants, and Dr. Paul Bartsch, assistant curator of mollusks, were members of an expedition by the Bureau of Fisheries steamer *Albatross*, which visited Guadaloupe Island, proceeded down the outer coast of Lower California and ascended the Gulf of California for a considerable distance. Valuable series of marine animals and of plants were secured, the former mostly by means of dredging, the latter during stops made along the coast.

The accessions in geology and mineralogy from the Geological Survey and other sources contained much interesting material and a number of type specimens. Especially important were several type series of Cambrian fossils described by Dr. Charles D. Walcott, and included in the noteworthy discoveries resulting from his recent explorations in British Columbia. Investigations in Kentucky and Tennessee by Dr. R. S. Bassler and Mr. Frank Springer yielded valuable collections of Silurian and Mississippian fossils. In vertebrate paleontology the more important additions consisted of mammalian and reptilian remains obtained in exchange.

An interesting series of articles of nickel produced by the late Joseph Wharton, of Philadelphia, who was recognized as the leader in the technology of this metal, was received as a donation from the executors of his estate. This collection, which had been preserved by Mr. Wharton in a cabinet at his home, comprises over 60 pieces, including pure nickel in several forms, harness and door trimmings, household utensils, forceps, magnetic needles, coinage blanks, etc., and is of much historical value.

The historical collection was greatly enriched, mainly by loans, and, by extending the exhibition space into a second hall, its installation has been much

improved. Rear Admiral R. E. Peary, United States Navy, retired, deposited the many medals conferred upon him by various geographical societies in recognition of his service to science in arctic exploration; the silver model of a ship and three loving cups presented to him; and two of the flags that he carried to the North Pole in 1909; all of which have been arranged together in a single case. Important additions to the collection of memorials of the Bailey-Myers-Mason family were received from Mrs. Julian James; valuable memorials of the Salter and Codwise families of colonial and revolutionary New York and New Jersey were lent by Miss Louise Salter Codwise; and interesting relics of the Schenck family of New Jersey dating back three generations were contributed by Dr. Clara S. Ludlow. The Gustavus Vasa Fox collection of Russian memorials was materially increased, and 11 pieces of furniture that once belonged to Gen. Rufus Putnam were received as a gift from his great-grandson, the late Judge E. M. P. Brister. An inhaler of the type used by Dr. William T. G. Morton in 1846, in the first operation which he performed with the use of ether as an anesthetic, and two busts of Dr. Morton were presented.

NATIONAL GALLERY OF ART.

The paintings of the National Gallery of Art continue to be exhibited in the large middle hall of the new building, the central part of which was specially fitted up for the purpose in 1910. While these quarters are already too restricted for the needs of the Gallery, the excellent lighting of this space makes possible an entirely satisfactory installation, which has attracted much attention.

Mr. William T. Evans, of New York, added 13 canvases to his notable collection of the works of contemporary American painters, which now comprises 127 pictures representing 90 artists. Mr. Evans also presented 81 examples of a series of 100 proofs designed to illustrate the work of the foremost American wood engravers, which he announced some time ago his intention to contribute. Mr. Charles L. Freer, whose important gift to the Nation of American and oriental art still remains in his keeping at Detroit, Mich., secured many valuable additions for his collection during an extended trip abroad, much of which was spent in China. The Gallery was fortunate in obtaining several interesting loans, including numerous examples of the paintings of early masters, and contributed to a number of important exhibitions held in other cities.

ART TEXTILES.

The loan collection of laces and other art textiles, which occupies one of the northern ranges in the older Museum building, was very largely increased both numerically and in the variety of its contents. Thirty-two loan contributions and three gifts, comprising 249 specimens, many of great beauty and value, brought the total number of specimens on exhibition up to 1,007. The supervision of the collection has been continued by Mrs. James W. Pinchot, to whose initiative and subsequent efforts, with the active cooperation of a number of ladies of Washington, the movement owes its success.

MISCELLANEOUS.

Of duplicate specimens taken from the collections, over 3,000, principally of recent animals and fossils, were distributed to schools and colleges, and about 23,500 were used in making exchanges. Approximately 24,600 specimens of various kinds were sent for study to specialists both in this country and abroad, mainly to be worked up and identified for the Museum.

The total number of visitors to the older Museum building was 207,010, to the Smithsonian building 167,085, and to the new Museum building 151,112. Considering that the buildings have been opened only during working hours on week days, this is to be regarded as a fair attendance. That it was smallest at the new building was owing to the fact that less than one-sixth of the exhibition space had been made ready for the public.

The publications issued comprised the annual report for 1910, two volumes of Proceedings, five bulletins, one volume of Contributions from the National Herbarium, and a large number of separate papers belonging to three unfinished volumes of Proceedings and two of Contributions. With the exception of the annual report, all were descriptive of material in the Museum collections. The number of copies of the various publications distributed was over 110,000.

By the addition of 6,127 books, pamphlets, and periodicals, the Museum library was increased to 40,211 volumes and 66,074 unbound publications.

The auditorium in the new building was used on several occasions for meetings of important scientific bodies. The sessions of the First American International Humane Congress, in connection with which an interesting exhibit was installed, were also held here from October 10 to 15, 1910.

The position of head curator of the department of biology, made vacant by the designation of Dr. F. W. True as an Assistant Secretary of the Institution on June 1, was filled by the appointment of Dr. Leonhard Stejneger, curator of reptiles and batrachians. For convenience of administration, the divisions of invertebrate paleontology, vertebrate paleontology, and paleobotany were combined, under the title of sections, in a single division of paleontology, with Dr. R. S. Bassler as curator.

Respectfully submitted.

RICHARD RATHBUN,

Assistant Secretary in Charge, U. S. National Museum.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

NOVEMBER 18, 1911.

APPENDIX II.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: I have the honor to present the following report on the operations of the Bureau of American Ethnology during the fiscal year ending June 30, 1911, conducted in accordance with the provisions of the act of Congress approved June 25, 1910, authorizing the continuation of ethnological researches among the American Indians and the natives of Hawaii, under the direction of the Smithsonian Institution, and in accordance with the plan of operations approved by the Secretary June 15, 1910.

The systematic ethnological researches of the bureau were continued during the year with the regular scientific staff, consisting of nine ethnologists, as follows: Mr. F. W. Hodge, ethnologist in charge; Mr. James Mooney, Dr. J. Walter Fewkes, Mrs. Matilda Coxe Stevenson, Mr. J. N. B. Hewitt, Dr. John R. Swanton, Dr. Truman Michelson, Dr. Paul Radin, and Mr. Francis La Flesche. In addition the services of several specialists in their respective fields were enlisted for special work, as follows:

Dr. Franz Boas, honorary philologist, with several assistants, for research in connection with the preparation and publication of the Handbook of American Indian Languages.

Miss Alice C. Fletcher and Mr. Francis La Flesche, for the final revision of the proofs of their monograph on the Omaha Indians for publication in the twenty-seventh annual report.

Miss Frances Densmore, for researches in Indian music.

Mr. J. P. Dunn, for studies of the tribes of the Middle West.

Mr. John P. Harrington, for researches among the Mohave Indians of the Colorado Valley.

Rev. Dr. George P. Donehoo, for investigations in the history, geography, and ethnology of the tribes of Pennsylvania for incorporation in the Handbook of American Indians.

Mr. William R. Gerard, for studies of the etymology of Algonquian place and tribal names and of terms that have been incorporated in the English language for use in the same work.

Prof. H. M. Ballou, for bibliographic research in connection with the compilation of the List of Works Relating to Hawaii.

Mr. James R. Murie, for researches pertaining to the ethnology of the Pawnee Indians.

The systematic ethnological researches by members of the regular staff of the bureau may be summarized as follows:

Mr. F. W. Hodge, ethnologist in charge, in addition to conducting the administrative work of the bureau, devoted attention, with the assistance of Mrs. Frances S. Nichols, to the final revision of the remaining proofs of Part 2 of the Handbook of American Indians (Bulletin 30), which was published in January, 1911. This work met with such great popular demand that the edition of the two parts became exhausted immediately after publication, causing the bureau much embarrassment owing to the thousands of requests that it has

not been possible to supply. To meet this need in part, the Senate, on May 12, adopted a concurrent resolution authorizing the reprinting of the entire handbook, and at the close of the fiscal year the resolution was under consideration by the Committee on Printing of the House of Representatives. The Superintendent of Documents has likewise been in receipt of many orders for the work, necessitating the reprinting of part 1 some months after its appearance, and about the close of the fiscal year another reprint of this part was contemplated. Much material for incorporation in a revised edition for future publication was prepared during the year, but lack of funds necessary for the employment of special assistants prevented the prosecution of this work as fully as was desired.

The bureau has been interested in and has conducted archeological explorations in the Pueblo region of New Mexico and Arizona for many years. Since the establishment of the School of American Archaeology in 1907, following the revival of interest in American archeology, by the Archaeological Institute of America, that body likewise commenced systematic work in the archeology of that great region. In order to avoid duplication of effort, arrangements were made between the bureau and the school for conducting archeological investigations in cooperation, the expense of the field work to be borne equally, a moiety of the collections of the artifacts and all the skeletal remains to become the property of the National Museum, and the bureau to have the privilege of the publication of all scientific results.

Active work under this joint arrangement was commenced in the Rito de los Frijoles, northwest of Santa Fé, New Mexico, in July, 1910, work having already been initiated there during the previous summer by the school independently, under the directorship of Dr. Edgar L. Hewett. In August, 1910, Mr. Hodge visited New Mexico for the purpose of participating in the work on the part of the bureau, and remained in the field for a month.

The great prehistoric site in the Rito de los Frijoles is characterized by an immense circular many-celled pueblo ruin, most of the stone walls of which are still standing to a height of several feet, and a series of cavate dwellings hewn in the soft tufa throughout several hundred yards of the northern wall of the canyon. Accompanying the great community ruin and also the cavate dwellings are underground kivas, or ceremonial chambers. In front of the cavate lodges were originally structures of masonry built against the cliff and forming front rooms, but practically the only remains of these are the foundation walls and the rafter holes in the cliff face. The debris covering these structures has been largely cleared away and the foundations exposed, and the walls of about two-thirds of the great pueblo structure in the valley have been bared by excavation. At the western extremity of the canyon, far up in the northern wall, is a natural cavern, known as Ceremonial Cave, in which are a large kiva, remarkably well preserved, and other interesting remains of aboriginal occupancy. This great archeological site in the Rito de los Frijoles is important to the elucidation of the problem of the early distribution of the Pueblos of the Rio Grande Valley, and there is reason to believe that when the researches are completed much light will be shed thereon. There is a paucity of artifacts in the habitations uncovered, aside from stone implements, of which large numbers have been found.

At the close of the work in the Rito de los Frijoles the joint expedition proceeded to the valley of the Jemez River, near the Hot Springs, where a week was spent in excavating the cemetery of the old Jemez village of Giusiwa. About 30 burials were disinterred here, and a few accompaniments of pottery vessels and other artifacts were recovered; but in the main the deposits had been completely destroyed by aboriginal disturbance, caused in part by covering the burials with heavy stones and partly by displacing the skeletons pre-

vously buried when subsequent interments were made. Glusiwa was inhabited in prehistoric times and also well within the historical period, as is attested by its massive, roofless church, built about the beginning of the seventeenth century. Nevertheless, no indication of Spanish influence was found in the ancient cemetery, and it is assumed that burial therein ceased with the coming of the missionaries and the establishment of the campo santo adjacent to the church. All collections gathered at Glusiwa have been deposited in the National Museum.

Other immense ruins on the summits of the mesas bounding the valley on the west were examined with the view of their future excavation. The exact position of the Jemez tribe among the Pueblo peoples is a problem, and both archeological and ethnological studies thereof are essential to its determination.

On completing this reconnoissance excavation was conducted in a cemetery at the great stone pueblo of Puye, on a mesa 8 miles west of the Tewa village of Santa Clara. About 50 burials were exhumed and sent to the National Museum, but artifacts were not found in abundance here, and as a rule they are not excellent in quality. In the joint work in the Rito de los Frijoles the expedition was fortunate in having the cooperation of Prof. Junius Henderson and Prof. W. W. Robbins, of the University of Colorado at Boulder, who, respectively, while the excavations were in progress, conducted studies in the ethno-zoology and the ethno-botany of the Tewa Indians, and also on the influence of climate and geology on the life of the early inhabitants of the Rito de los Frijoles. At the same time Mr. J. P. Harrington continued his researches in Tewa geographic nomenclature and cooperated with Professors Henderson and Robbins in supplying the native terms for plants and animals used by these Indians as food and medicine in ceremonies and for other purposes. The expedition was also fortunate in having the services of Mr. Sylvanus G. Morley in connection with the excavations in the Rito, of Mr. K. M. Chapman in the study of the decoration of the pottery and of the pictographs of the entire upper Rio Grande region, of Mr. Jesse L. Nusbaum in the photographic work, and of Mr. J. P. Adams in the surveying. Valued aid was also rendered by Messrs. Neil M. Judd, Donald Beauregard, and Nathan Goldsmith.

The scientific results of the joint research are rapidly nearing completion and will be submitted to the bureau for publication at an early date.

Throughout almost the entire year Mr. James Mooney, ethnologist, was occupied in the office in compiling the material for his study of Indian population covering the whole territory north of Mexico from the first white occupancy to the present time. By request of the Nebraska State Historical Society he was detailed in January, 1911, to attend the joint session of that body and the Mississippi Valley Historical Association, at Lincoln, Nebraska, where he delivered three principal addresses bearing particularly on the method and results of the researches of the bureau with the view of their application in local historical and ethnological investigations.

On June 4 Mr. Mooney started for the reservation of the East Cherokee in North Carolina to continue former studies of the sacred formulas and general ethnology of that tribe, and was engaged in this work at the close of the month.

At the beginning of the fiscal year Dr. J. Walter Fewkes, ethnologist, was in northern Arizona examining the great cave pueblos and other ruins within the Navaho National Monument. He found that since his visit in 1909 considerable excavation had been done by others in the rooms of Betatakin, and that the walls of Kitsiel, the other large cliff ruin, were greatly in need of repair. Guided by resident Navaho, he visited several hitherto undescribed cliff dwellings and gathered a fairly good collection of objects illustrating prehistoric culture of this part of northern Arizona, which have been deposited in the

National Museum. In order to facilitate the archeological work and to make the region accessible to students and visitors it was necessary to break a wagon road from Marsh Pass through the middle of the Navaho National Monument to the neighborhood of Betatakin, and by this means the valley was traversed with wagons for the first time.

On the return journey to Flagstaff, Dr. Fewkes visited the ruins in Nitsi, or West Canyon, and examined Inscription House, a prehistoric cliff dwelling of considerable size, hitherto undescribed, the walls of which are built of loaf-shaped adobes strengthened with sticks. On account of the size and great interest of these ruins, it is recommended that the area covered thereby be included in the Navaho National Monument and the ruins permanently preserved, and that either Betatakin or Kitsiel be excavated, repaired, and made a "type ruin" of this culture area. Along the road to Flagstaff from West Canyon, Dr. Fewkes observed several ruins and learned of many others ascribed to the ancient Hopi. He visited the Hopi pueblo of Moenkopi, near Tuba, and obtained considerable new ethnological material from an old priest of that village regarding legends of the clans that formerly lived in northern Arizona. He learned also of a cliff, or rock, covered with pictographs of Hopi origin, at Willow Spring, not far from Tuba, the figures of which shed light on Hopi clan migration legends.

Returning to Flagstaff, Dr. Fewkes reoutfitted in order to conduct investigations of the ruins near Black Falls of the Little Colorado River, especially the one called Wukoki, reputed to have been the last habitation of the Snake clans of the Hopi in their southern migration before they finally settled near the East Mesa. A little more than a month was spent at these ruins, during which time extensive excavations were made in numerous subterranean rooms, or pit dwellings, a new type of habitations found at the bases of many of the large ruined pueblos on the Little Colorado. Incidentally several other pueblo ruins, hitherto unknown, with accompanying reservoirs and shrines, were observed. The excavations at Wukoki yielded about 1,800 specimens, consisting of painted pottery, beautiful shell ornaments, stone implements, basketry, wooden objects, cane "cloud blowers," prayer sticks, a prayer-stick box, an idol, and other objects. The results of the excavations at Wukoki will be incorporated in a forthcoming bulletin on Antiquities of the Little Colorado Basin.

On the completion of his work at the Black Falls ruins, Dr. Fewkes returned to Washington in September and devoted the next three months to the preparation of a monograph on Casa Grande, Arizona.

At the close of January, 1911, Dr. Fewkes again took the field, visiting Cuba for the purpose of gathering information on the prehistoric inhabitants of that island and their reputed contemporaneity with fossil sloths, sharks, and crocodiles. A fortnight was devoted to the study of collections of prehistoric objects in Habana; especially the material in the University Museum from caves in Puerto Principe Province, described by Drs. Montané and Carlos de la Torre. With this preparation he proceeded to the Isle of Pines and commenced work near Nueva Gerona. In this island there are several caves from which human bones have been reported locally, but the Cueva de los Indios, situated in the hills about a mile from the city named, promised the greatest reward. A week's excavation in this cave yielded four fragments of Indian skulls, not beyond repair; one undeformed, well-preserved, human cranium; and many fragments of pelves, humeri, and femora. The excavations in the middle of the cave indicated that the soil there had previously been dug over: these yielded little of value, the best-preserved remains occurring near the entrance, on each side. The skulls were arranged in a row within a pocket sheltered by

an overhanging side of the cave, and were buried about 2 feet in the guano and soil; beneath these crania were human long-bones, crossed. Several fragments of a single skull or of several skulls were embedded in a hard stalagmitic formation over the deposit of long-bones. No Indian implements or pottery accompanied the bones, and no fossils were found in association with them. So far as recorded this is the first instance of the finding of skeletal remains of cave man in the Isle of Pines. Their general appearance and mode of burial were the same as in the case of those discovered by Drs. Montoné and Carlos de la Torre.

Dr. Fewkes also examined, in the Isle of Pines, about 30 structures known as *cacimbas*, their Indian name. These are vase-shaped, subterranean receptacles, averaging 6 feet in depth and 4 feet in maximum diameter, generally constricted to about 2 feet at the neck, and with the opening level with the surface of the ground. Although these *cacimbas* are generally ascribed to the Indians, they are thought by some to be of Spanish origin, and are connected by others with buccaneers, pirates, and slavers. They are built of masonry or cut in the solid rock; the sides are often plastered and the bottoms commonly covered with a layer of tar. On the ground near the openings there is generally a level, circular space, with raised periphery. The whole appearance supports the theory that these structures were used in the manufacture of turpentine or tar, the circular area being the oven and the *cacimba* the receptacle for the product.

Dr. Fewkes found that the *Pineros*, or natives of the island, employ many aboriginal terms for animals, plants, and places, and in some instances two Indian words are used for the same object. An acknowledged descendant of a Cuban Indian explained this linguistic duality by saying that the Indians of the eastern end of the Isle of Pines spoke a dialect different from those of the western end, and that when those from Camaguey, who were Tainan and of eastern Cuban origin, came to the Isle of Pines at the instance of the Spanish authorities they brought with them a nomenclature different from that then in use on that island.

Several old Spanish structures of masonry, the dates of which are unknown, were also examined in the neighborhood of Santa Fé, Isle of Pines. The roof of a cave at Punta de Este, the southeastern angle of the island, bears aboriginal pictographs of the sun and other objects, suggesting that it is comparable with the cave in Haiti, in which, in Indian legend, the sun and the moon originated and from which the races of man emerged.

Dr. Fewkes has now collected sufficient material in Cuba to indicate that its western end, including the Isle of Pines, was once inhabited by a cave-dwelling people, low in culture and without agriculture. His observations support the belief that this people were in that condition when Columbus visited the Isle of Pines, and that they were survivors of the *Guanahatibibes*, a cave-dwelling population formerly occupying the whole of Cuba and represented in Porto Rico and other islands of the West Indies.

Dr. Fewkes also visited several of the coral keys southwest of Isle of Pines, but, finding no aboriginal traces, he crossed the channel to Cayman Grande, about 250 miles from Nueva Gerona. The Cayman group consists of coral islands built on a submarine continuation of the mountains of Santiago Province, Cuba. A cave with Indian bones and pottery, probably of Carib origin, was found near Boddentown on the eastern end of the island, and a few stone implements were obtained from natives, but as these specimens may have been brought from adjacent shores they afford little evidence of a former aboriginal population of Cayman Grande. The elevation of the Cayman Islands, computed from the annual accretion, would indicate that Cayman

Grande was a shallow reef when Columbus visited Cuba, and could not have been inhabited at that time. The discoverer passed very near it on his second voyage, when his course lay from the Isle of Pines to Jamaica, but he reported neither name nor people.

Dr. Fewkes returned to Washington in April and spent the remainder of the year in completing his report on Casa Grande.

Dr. John R. Swanton, ethnologist, devoted the first quarter of the year chiefly to collecting material from libraries and archives, as the basis of his study of the Creek Indians. From the latter part of September until early in December he was engaged in field research among the Creek, Natchez, Tonkawa, and Alibamu Indians in Oklahoma and Texas, and also remained a short time with the remnant of the Tunica and Chitimacha in Louisiana, and made a few side trips in search of tribes which have been lost to sight within recent years. On his return to Washington, Dr. Swanton transcribed the linguistic and ethnologic material collected during his field excursion, read the proofs of *Bulletins* 44, 46, and 47, added to the literary material regarding the Creek Indians, collected additional data for a tribal map of the Indians of the United States, and initiated a study of the Natchez language with the special object of comparing it with the other dialects of the Muskogean family. Dr. Swanton also spent some time in studying the Chitimacha and Tunica languages.

From July, 1910, until the middle of April, 1911, Mrs. M. C. Stevenson, ethnologist, was engaged in the completion of a paper on Dress and Adornment of the Pueblo Indians, in the elaboration of her report on Zúñi Plants and Their Uses, and in transcribing her field notes pertaining to Zúñi religious concepts and the mythology and ethnology of the Taos Indians.

Mrs. Stevenson left Washington on April 12 and proceeded directly to the country of the Tewa Indians, in the valley of the Rio Grande in New Mexico, for the purpose of continuing her investigation of those people. Until the close of the fiscal year her energies were devoted to the pueblo of San Ildefonso and incidentally to Santa Clara, information particularly in regard to the Tewa calendar system, ceremonies, and material culture being gained. Mrs. Stevenson finds that the worship of the San Ildefonso Indians includes the same celestial bodies as are held sacred by the Zúñi and other Pueblos. From the foundation laid during her previous researches among the Tewa, Mrs. Stevenson reports that she has experienced little difficulty in obtaining an insight into the esoteric life of these people, and is daily adding to her store of knowledge respecting their religion and sociology. A complete record of obstetrical practices of the Tewa has been made, and it is found that they are as elaborate as related practices of the Taos people. The San Ildefonso inhabitants do not seem to have changed their early customs regarding land tenure, and they adhere tenaciously to their marriage customs and birth rites, notwithstanding the long period during which missionaries have been among them. It is expected that, of her many lines of study among the Tewa tribes, the subject of their material culture will produce the first results for publication.

After completing some special articles on ethnologic topics for the closing pages of Part 2 of the Handbook of American Indians, Mr. J. N. B. Hewitt, ethnologist, pursued the study of the history of the tribes formerly dwelling in the Susquehanna and upper Ohio valleys. Progress in these researches was interrupted by the necessity of assigning him to the editorial revision and annotation of a collection of 120 legends, traditions, and myths of the Seneca Indians, recorded in 1884 and 1885 by the late Jeremiah Curtin. At the close of the year this work was far advanced, only about 150 pages of a total of 1,400 pages remaining to be treated. It is designed to publish this material.

with Mr. Hewitt's introduction, notes, and explanatory matter, in a forthcoming annual report. As opportunity afforded, Mr. Hewitt also resumed the preparation of his sketch of the grammar of the Iroquois for incorporation in the Handbook of American Indian Languages.

As in previous years, Mr. Hewitt prepared and collected data for replies to numerous correspondents requesting special information, particularly in regard to the Iroquois and Algonquian tribes. Mr. Hewitt also had charge of the important collection of 1,716 manuscripts of the bureau, cataloguing new accessions and keeping a record of those withdrawn in the progress of the bureau's researches. During the year, 378 manuscripts were thus made use of by the members of the bureau and its collaborators. Exclusive of the numerous manuscripts prepared by the staff of the bureau and by those in collaboration with it, referred to in this report, 12 items were added during the year. These pertain to the Pawnee, Chippewa, Zuzi, and Tewa tribes, and relate to music, sociology, economics, and linguistics.

The beginning of the fiscal year found Dr. Truman Michelson, ethnologist, conducting ethnological and linguistic investigations among the Piegan Indians of Montana, whence he proceeded to the Northern Cheyenne and Northern Arapaho, thence to the Menominee of Wisconsin, and finally to the Micmac of Restigouche, Canada—all Algonquian tribes, the need of a more definite linguistic classification of which has long been felt. Dr. Michelson returned to Washington at the close of November and immediately commenced the elaboration of his field notes, one of the results of which is a manuscript bearing the title "A Linguistic Classification of the Algonquian Tribes," submitted for publication in the twenty-eighth annual report. Also in connection with his Algonquian work Dr. Michelson devoted attention to the further revision of the material pertaining to the Fox grammar, by the late Dr. William Jones, the outline of which is incorporated in the Handbook of American Indian Languages. During the winter Dr. Michelson took advantage of the presence in Washington of a deputation of Chippewa Indians from White Earth, Minnesota, by enlisting their services in gaining an insight into the social organization of that tribe and also in adding to the bureau's accumulation of Chippewa linguistic data. Toward the close of June, 1911, Dr. Michelson proceeded to the Sauk and Fox Reservation in Iowa for the purpose of continuing his study of that Algonquian group.

The months of July and August and half of September, 1910, were spent by Dr. Paul Radin, ethnologist, among the Winnebago Indians of Nebraska and Wisconsin, his efforts being devoted to a continuation of his studies of the culture of those people, with special reference to their ceremonial and social organization and their general social customs. Part of the time was devoted to a study of the Winnebago material culture, but little progress was made in this direction, as few objects of aboriginal origin are now possessed by these people, consequently the study must be completed by examination of their objects preserved in museums and private collections. A beginning in this direction was made by Dr. Radin during the latter half of September and in October at the American Museum of Natural History, New York City. During the remainder of the fiscal year Dr. Radin was engaged in arranging the ethnological material gathered by him during the several years he has devoted to the Winnebago tribe, and in the preparation of a monograph on the Medicine Ceremony of the Winnebago and a memoir on the ethnology of the Winnebago tribe in general. In June, 1911, he again took the field in Wisconsin for the purpose of obtaining the data necessary to complete the tribal monograph. Both these manuscripts, it is expected, will be finished by the close of the present calendar year.

By arrangement with the Commissioner of Indian Affairs the bureau was fortunate in enlisting the services of Mr. Francis La Flesche, who has been frequently mentioned in the annual reports of the bureau in connection with his studies, jointly with Miss Alice C. Fletcher, of the ethnology of the Omaha tribe of the Siouan family. Having been assigned the task of making a comparative study of the Osage tribe of the same family, Mr. La Flesche proceeded to their reservation in Oklahoma in September. The older Osage men, like the older Indians generally, are very conservative, and time and tact were necessary to obtain such standing in the tribe as would enable him to establish friendly relations with those to whom it was necessary to look for trustworthy information. Although the Osage language is similar to that of the Omaha, Mr. La Flesche's native tongue, there are many words and phrases that sound alike but are used in a different sense by the two tribes. Having practically mastered the language, Mr. La Flesche was prepared to devote several months to what is known as the No''ho''zhi''ga Ie'ta, the general term applied to a complex series of ceremonies which partake of the nature of degrees, but are not, strictly speaking, successive steps, although each one is linked to the other in a general sequence. While at the present stage of the investigation it would be premature to make a definite statement as to the full meaning and interrelation of these Osage ceremonies, there appear to be seven divisions of the No''ho''zhi''ga Ie'ta, the names, functions, and sequence of which have been learned, but whether the sequence thus far noted is always maintained remains to be determined. From Saucy-Calf, one of the three surviving Osage regarded as past masters in these ceremonies, phonographic records of the first of the ceremonies, the Waxo'be-awatho'', have been made in its entirety, consisting of 80 songs with words and music, and 7 prayers. All these have been transcribed and in part translated into English, comprising a manuscript exceeding 300 pages. In order to discuss with the Osage the meaning of these rituals, Mr. La Flesche found it necessary to commit them to memory, as reading from the manuscript disconcerted the old seer. At Saucy-Calf's invitation Mr. La Flesche witnessed in the autumn, at Grayhorse, a performance of the ceremony of the Waxo'be-awatho'', the recitation of the rituals of which requires one day, part of a night, and more than half of the following day. It is Mr. La Flesche's purpose to record, if possible, the rituals of the remaining six divisions of the No''ho''zhi''ga Ie'ta. He has already obtained a paraphrase of the seventh ceremony (the Nik'ino''k'o''), and hopes soon to procure a phonographic record of all the rituals pertaining thereto.

In connection with his ethnological work Mr. La Flesche has been so fortunate as to obtain for the National Museum four of the waxo'be, or sacred packs, each of which formed a part of the paraphernalia of the No''ho''zhi''ga Ie'ta, as well as a waxo'be-to''ga, the great waxo'be which contains the instruments for tattooing. Only those Osage are tattooed who have performed certain acts prescribed in the rites of the No''ho''zhi''ga Ie'ta. The rites of the tattooing ceremony are yet to be recorded and elucidated. While the waxo'be is the most sacred of the articles that form the paraphernalia of the No''ho''zhi''ga Ie'ta rites, it is not complete in itself; other things are indispensable to their performance, and it is hoped that these may be procured at some future time.

While not recorded as one of the ceremonial divisions of the No''ho''zhi''ga Ie'ta, there is a ceremony so closely connected with it that it might well be regarded as a part thereof—this is the Washa'beathi'' watsi, or the dance of the standards. The introductory part of this ceremony is called Akixage, or weeping over one another in mutual sympathy by the members of the two great divisions of the tribe. There is no regular time for the performance of the Washa'beathi''n ceremony. It is given only when a member of the tribe loses

by death some specially loved and favored relative and seeks a ceremonial expression of sympathy from the entire tribe. It is the intention to procure the songs and rituals of this ceremony, and specimens of the standards employed in its performance.

Altogether Mr. La Flesche has made excellent progress in his study of the Osage people, and the results are already shedding light on the organization and the origin and function of the ceremonies of this important tribe.

The special researches of the bureau in the field of linguistics were conducted by Dr. Franz Boas, honorary philologist, one of the immediate and tangible results of which was the publication of Part 1 of the Handbook of American Indian Languages. It seems desirable to restate at the present time the development of the plan and the object of this work.

Through the efforts of the late Maj. Powell and his collaborators a great number of vocabularies and a few grammars of American Indian languages had been accumulated, but no attempt had been made to give a succinct description of the morphology of all the languages of the continent. In order to do this, a series of publications was necessary. The subject matter had to be represented by a number of grammatical sketches, such as are now being assembled in the Handbook of American Indian Languages. To substantiate the inductions contained in this grammar, collections of texts are indispensable to the student, and finally a series of extended vocabularies are required. The plan, as developed between 1890 and 1900, contemplated the assembling in the bulletin series of the bureau of a series of texts which were to form the basis of the handbook. Of this series, Dr. Boas's Chinook, Kathlamet, and Tsimshian Texts, and Swanton's Haida and Tlingit Texts, subsequently published, form a part, but at the time Swanton's Texts appeared it was believed by Secretary Langley that material of this kind was too technical in character to warrant publication in a governmental series. It was, therefore, decided to discontinue the text series in the bulletins of the bureau and to divert them to the Publications of the American Ethnological Society and the Columbia University Contributions to Anthropology. Other series were commenced by the University of California and the University of Pennsylvania. The method of publication pursued at the present time, though different from that first planned, is acceptable, since all the material is accessible to students, and the bureau is saved the expense of publication.

Dr. Boas has been enabled to base all the sketches in the first volume of his handbook on accompanying text series, as follows:

- (1) Athapascan. Text published by the University of California.
- (2) Tlingit. Text published by the Bureau of American Ethnology, but too late to be used systematically.
- (3) Haida. Texts published by the Bureau of American Ethnology.
- (4) Tsimshian. Texts published by the Bureau of American Ethnology and the American Ethnological Society.
- (5) Kwakiutl. Texts published by the Jesup Expedition and in the Columbia University series.
- (6) Chinook. Texts published by the Bureau of American Ethnology.
- (7) Maidu. Texts published by the American Ethnological Society, but too late to be used.
- (8) Algonquian. Texts published by the American Ethnological Society.
- (9) Sioux. Texts in Contributions to North American Ethnology.
- (10) Eskimo. Texts in "Meddelelser om Grønland," but not used systematically.

Although Dr. Boas has urged the desirability of undertaking the publication of the series of vocabularies, no definite steps have yet been taken toward the

realization of this plan, owing largely to lack of funds for the employment of assistants in preparing the materials. It is hoped, however, that such a series of vocabularies, based on the published grammars and on the series of texts above referred to, may be prepared for publication in the near future. Much of the preliminary work has been done. There are, for example, extended manuscript dictionaries of the Haida, Tsimshian, Kwakiutl, Chinook, and Sioux, but none of them is yet ready for the printer.

The work on Part 2 of the Handbook of American Indian Languages is progressing satisfactorily. The sketch of the Takelma is in page form (pp. 1-296), but Dr. Boas has undertaken the correlation of this sketch with the Takelma Texts which meanwhile have been published by the University of Pennsylvania, and a considerable amount of work remains to be done to finish this revision. The Coos grammar is in galleys. The Coos Texts are at the present writing being printed by the American Ethnological Society, and here also references are being inserted. Dr. Leo J. Frachtenberg has continued his collection of material for the handbook with commendable energy and intelligence. The field work has been financially aided by Columbia University, partly through a gift made by Mrs. Henry Villard and partly through funds provided by Mr. Homer E. Sargent. It has also been possible to utilize for the work on the Alsea the collections made at a former time by Prof. Livingston Farrand on an expedition supported by the late Mr. Henry Villard. On his last expedition Dr. Frachtenberg was able to determine that the Siuslaw is an independent stock, although morphologically affiliated with the Alsea, Coos, and Siuslaw group. He also collected extensive material on the Alsea and Molala.

The most important result, which is appearing more and more clearly from the investigations carried out under the direction of Dr. Boas, lies in the fact that it will be possible to classify American languages on a basis wider than that of linguistic stocks. In 1893 Dr. Boas called attention to the fact that a number of languages in northern British Columbia seem to have certain morphological traits in common, by which they are sharply differentiated from all the neighboring languages, although the evidence for a common origin of the stocks is unsatisfactory. Dr. Boas and his assistants have followed this observation, and it can now be shown that throughout the continent languages may be classed in wider morphological groups. It is interesting to note that phonetic groups may be distinguished in a similar manner, but these do not coincide with the morphological groups. These observations are in accord with the results of modern inquiries in Africa and Asia, where the influence of Hamitic phonetics on languages of the Sudan and the influence of Sumerian on early Babylonian have been traced in a similar manner. Analogous conditions seem to prevail also in South Africa, where the phonetics of the Bushman languages have influenced the neighboring Bantu languages. In this way a number of entirely new and fundamental problems in linguistic ethnography have been formulated, the solution of which is of the greatest importance for a clear understanding of the early history of the American Continent.

The Handbook of American Indian Languages as planned at the present time deals exclusively with an analytical study of the morphology of each linguistic family, without any attempt at a detailed discussion of phonetic processes, their influence upon the development of the language, and the relation of dialects. Dr. Boas recommends that the present Handbook of American Indian Languages be followed by a series of handbooks each devoted to a single linguistic stock, in which the development of each language, so far as it can be traced by comparative studies, should be treated.

The study of aboriginal American music was conducted among the Chippewa Indians by Miss Frances Densmore, who extended her field of work previously

begun among that people and elaborated the system of analyzing their songs. After spending several weeks on the Lac du Flambeau Reservation in Wisconsin she accompanied the Chippewa from that reservation to the Menominee Reservation in the same State, where the Lac du Flambeau Chippewa ceremonially presented two drums to the Menominee. This ceremony was closely observed, photographs being taken and the speeches of presentation translated, and the songs of the ceremony were recorded by Miss Densmore on a phonograph after the return of the drum party to Lac du Flambeau. Many of the songs are of Sioux origin, as the ceremony was adopted from that people; consequently the songs were analyzed separately from those of Chippewa origin. Numerous old war songs were recorded at Lac du Flambeau, also songs said to have been composed during dreams, and others used as accompaniments to games and dances. The analytical tables published during the year in Bulletin 45, Chippewa Music, have been combined by Miss Densmore with those of songs collected during the year 1910-11, making a total of 340 Chippewa songs under analysis. These are analyzed in 12 tables, showing the structure, tone material, melodic progression, and rhythm of the songs, the rhythm of the drum, the relation between the metric unit of the voice and drum, and other points bearing on the development and form of primitive musical expression. This material is now almost ready for publication. The Sioux songs of the drum presentation ceremony, similarly analyzed, constitute the beginning of an analytical study of the Sioux music, which will be continued and extended during the fiscal year 1911-12.

Miss Alice C. Fletcher and Mr. La Flesche conducted the final proof revision of their monograph on the Omaha tribe, to accompany the twenty-seventh annual report, which was in press at the close of the fiscal year. This memoir will comprise 658 printed pages and will form the most complete monograph of a single tribe that has yet appeared.

Mr. J. P. Dunn, whose studies of the Algonquian tribes of the Middle West have been mentioned in previous reports, deemed it advisable, before continuing his investigation of the languages of the tribes comprising the former Illinois confederacy, to await the completion of the copying of the anonymous manuscript Miami-French Dictionary, attributed to Père Joseph Ignatius Le Boulanger, in the John Carter Brown Library at Providence, Rhode Island. Through the courteous permission of Mr. George Parker Winship, librarian, the bureau has been enabled to commence the copying of this manuscript, the difficult task being assigned to Miss Margaret Bingham Stillwell, under Mr. Winship's immediate direction. At the close of the fiscal year 20½ pages of the original (comprising 95 pages of transcript), of the total of 155 pages of the dictionary proper, were finished and submitted to the bureau. It is hoped that on the completion of the copying the bureau will have a basis for the study of the Miami and related languages that would not be possible among the greatly modified remnant of the Indians still speaking them.

Prof. Howard M. Ballou, of Honolulu, has continued the preparation of the List of Works Relating to Hawaii, undertaken in collaboration with the late Dr. Cyrus Thomas, and during the year submitted the titles of many early publications, including those of obscure books printed in the Hawaiian language.

Mr. John P. Harrington, of the School of American Archaeology, proceeded in March to the Colorado Valley in Arizona and California for the purpose of continuing his studies, commenced a few years before, among the Mohave Indians, and incidentally to make collections for the United States National Museum. Mr. Harrington was still among these Indians at the close of July, and the results of his studies, which cover every phase of the life of this interesting people, are to be placed at the disposal of the bureau for publication.

PUBLICATIONS.

The general editorial work of the bureau continued in immediate charge of Mr. J. G. Gurley, editor. The editing of Part 2 of Bulletin 30, Handbook of American Indians, was conducted by Mr. Hodge, while the editorial supervision of Bulletin 40, Handbook of American Indian Languages, was in charge of Dr. Boas. At the close of the fiscal year the twenty-seventh annual report was nearly ready for the bindery; more than one-third of Bulletin 40, Part 2, was in type (mostly in pages); and Bulletin 47, a Dictionary of the Biloxi and Ofo Languages, by Dorsey and Swanton, was in page form. Some progress had been made in the revision of the galley proof of Bulletin 46, Byington's Choctaw Dictionary, a work requiring the expenditure of considerable time and labor. Much of Mr. Gurley's time during the year was given to the work of editing and proof reading the twenty-seventh annual report and its accompanying paper, the monograph on the Omaha tribe, by Miss Fletcher and Mr. La Flesche, above referred to. The following publications were issued during the year:

Bulletin 30. Handbook of American Indians North of Mexico (F. W. Hodge, editor), Part 2.

Bulletin 37. Antiquities of Central and Southeastern Missouri (Gerard Fewkes).

Bulletin 40. Handbook of American Indian Languages (Franz Boas, editor), Part 1.

Bulletin 43. Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico (J. R. Swanton).

Bulletin 44. Indian Languages of Mexico and Central America and their Geographical Distribution (Cyrus Thomas and J. R. Swanton).

Bulletin 45. Chippewa Music (Frances Densmore).

Bulletin 50. Preliminary Report on a Visit to the Navaho National Monument, Arizona (J. Walter Fewkes).

Bulletin 51. Antiquities of the Mesa Verde National Park: Cliff Palace (J. Walter Fewkes).

The preparation of the illustrations for the publications of the bureau and the making of photographic portraits of the members of visiting deputations of Indians were in charge of Mr. De Lancey Gill, illustrator. Of the 246 negatives made, 120 comprise portraits of visiting Indians. In addition 372 photographic films, exposed by members of the bureau in connection with their field work, were developed and printed. Photographic prints for publication and exchange were made to the number of 1,469, and 22 drawings for use as illustrations were prepared. Mr. Gill was assisted, as in the past, by Mr. Henry Walther.

LIBRARY.

The library of the bureau has continued in the immediate charge of Miss Ella Leary, librarian. During the year that part of the southeastern gallery of the lower main hall of the Smithsonian Building which was vacated by the National Museum, was assigned to the use of the bureau library, and three additional stacks were built, providing shelf room for about 2,500 volumes. Nearly that number of books which had been stored, and consequently made inaccessible, were placed on the new shelves. The policy carried out from year to year of increasing the library by exchange with other institutions has been continued, and special effort made to complete the collection of serial publications. Especially to be noted is the completion of the sets of publications of the Maine Historical Society and the Archives of Pennsylvania, both rich in

material pertaining to the Indians. As in the past, it has been necessary for the bureau to make use of the Library of Congress from time to time, about 200 volumes having been borrowed during the year. Twelve hundred books and approximately 650 pamphlets were received, in addition to the current numbers of more than 600 periodicals. Of the books and pamphlets received, 148 were acquired by purchase, the remainder by gift or exchange. Six hundred and eighty-nine volumes were bound by the Government Printing Office, payment therefor being made from the allotment "for printing and binding * * * annual reports and bulletins of the Bureau of American Ethnology, and for miscellaneous printing and binding," authorized by the sundry civil act. This provision has enabled the bureau, during the last two years, to bind many volumes almost in daily use which were threatened with destruction. The catalogue of the bureau now records 17,250 volumes; there are also about 12,200 pamphlets, and several thousand unbound periodicals. The library is constantly referred to by students not connected with the bureau, as well as by various officials of the Government service.

PROPERTY.

As noted in previous reports the principal property of the bureau consists of its library, manuscripts, and photographic negatives. In addition it possesses a number of cameras, phonographic machines, and ordinary apparatus and equipment for field work, stationery and office supplies, a moderate amount of office furniture, typewriters, etc., and the undistributed stock of its publications. The sum of \$304.62 was expended for office furniture (including bookstacks at a cost of \$205) during the fiscal year.

RECOMMENDATIONS.

For the purpose of extending the systematic researches of the bureau and of affording additional facilities for its administration, the following recommendations are made:

A question having arisen in the Committee on Appropriations of the House of Representatives as to the purpose for which an increase of \$2,000 in the bureau's appropriation in 1909 was intended, the work of excavating and repairing antiquities existing in national parks and monuments has been curtailed. The importance of elucidating the archeological problems connected with these ancient remains and of repairing the more important of them for visitors and for future students is so apparent that the need of continuing this work is generally recognized, consequently an estimate of \$4,000 "for the exploration and preservation of antiquities" has been submitted for the next fiscal year.

Ethnological research in Alaska is urgently needed by reason of the great changes taking place among the Indians and the Eskimo since the influx of white people a few years ago. Unless this investigation is undertaken at once the aboriginal inhabitants will have become so modified by contact with whites that knowledge of much of their primitive life will be lost. It is recommended that the sum of \$4,500 be appropriated for this work.

The more speedy extension of ethnological researches among the remnants of the Algonquian tribes formerly occupying the Middle West is desired. In a number of cases these tribes are represented by only a few survivors who retain any knowledge of the traits, language, and customs of their people, hence it will be impossible to gather much of this information unless the work is extended more rapidly, as the funds now at the bureau's disposal for this purpose are inadequate. The additional sum of \$1,000 is recommended for this purpose.

As previously stated, the demand for the Handbook of American Indians has been so great that many schools and libraries have necessarily been denied. The need of a revised edition is urgent, but the revision can not be satisfactorily undertaken and the latest information incorporated without the employment of special ethnologic assistants—those who have devoted special study to particular tribes—and editorial and clerical aid. It is recommended that the sum of \$3,800 be appropriated for this purpose.

The bureau is constantly in receipt of requests from schools, historical societies, compilers of textbooks, etc., for photographic prints of Indian subjects, since it is generally known that the bureau possesses many thousands of negatives accumulated in the course of its investigations. As no funds are now available for this purpose, it is recommended that a reasonable sum, say \$1,000, be appropriated for the purpose of furnishing prints for educational purposes. In most cases applicants would doubtless be willing to pay the cost, but at present the bureau has no authority for selling photographs.

The manuscripts accumulated by the bureau form a priceless collection; indeed many of them, if lost, could not be replaced, since they represent the results of studies of Indians who have become extinct or have lost their tribal identity. It is therefore urgently recommended that the sum of \$1,350 be appropriated for fireproofing a room and for providing metal cases for the permanent preservation of the manuscripts.

Respectfully submitted.

F. W. HODGE, *Ethnologist in Charge.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX III.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1911, which was prepared under the direction of Mr. C. W. Shoemaker, chief clerk, who was in charge of the service from January, 1910, until June 1, 1911.

The congressional appropriation for the support of the service during 1911 was \$32,200 (the same amount granted for the past three years), and the sum collected on account of repayments was \$4,754.99, making the total available resources for carrying on the system of international exchanges \$36,954.99.

The total number of packages handled during the year was 228,698—an increase over the number for the preceding year of 7,073. The weight of these packages was 560,808 pounds—a gain of 76,124 pounds. For purposes of comparison the number and weight of packages of different classes are indicated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad.....	103,769	.....	116,219	.....
Publications received in return for parliamentary documents.....	.....	1,752	.....	18,467
United States departmental documents sent abroad.....	55,104	.....	216,686	.....
Publications received in return for departmental documents.....	.....	8,715	.....	18,837
Publications from miscellaneous sources sent abroad.....	28,834	.....	56,165	.....
Publications received from abroad for miscellaneous distribution.....	.....	30,524	.....	134,434
Total.....	187,707	40,991	389,070	171,788
Grand total.....	228,698		560,808	

The disparity between the number of packages received and those sent may be accounted for, in part, by the fact that many returns for publications sent abroad are forwarded to their destinations by mail and not through the exchange service. This difference is further due to the fact that whereas packages sent are made up in most cases of separate publications, those received contain several volumes—in some instances the term "package" being applied to large boxes often containing 100 or more publications.

By referring to the above statement it will be noted that 74 per cent of the work of the office has been conducted in behalf of the United States governmental establishments.

Of the 2,380 boxes used in forwarding exchanges to foreign bureaus and agencies for distribution (an increase of 347 boxes over 1910), 385 boxes contained full sets of United States official documents for authorized depositories and 1,995 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents.

Several changes have been made during the year in the routine of the Exchange Office looking to the economical and efficient administration of the service. These changes are here briefly referred to.

It had been the practice for many years to keep a card record of both incoming and outgoing packages—a credit and debit account with each establishment or individual using the facilities of the Exchange Service—thus enabling the Institution to answer inquiries concerning the transmission of any particular package without delay. As the keeping of these cards involved a great deal of labor—quite out of proportion to the benefits derived therefrom—and also as most of the information given thereon could, with the expenditure of a little more time, be obtained from other records in the office, the detailed statement of outgoing packages has been discontinued. This curtailment in the work has made it possible to dispense with the services of one of the clerks in the record room. The discontinuance of these cards has, furthermore, brought about a change in the work in the shipping room whereby the preparation of consignments for transmission abroad is facilitated.

Since the fiscal year 1897 there has been printed in the report on the exchanges, under the caption "Interchange of Publications between the United States and Other Countries," a statement showing in detail the number of packages sent to and received from each country through the International Exchange Service. In most instances, the statistics contained in these statements indicated that a much larger number of packages were sent abroad than were received in return. While it is true that a certain disparity exists, the statements were misleading, since, as already explained, a great many packages are received through other channels by correspondents in this country in return for those sent through the Exchange Service. In view of this fact, and also because the statistics contained in these statements were seldom required for the use of the Exchange Office, the keeping of the detailed record from which they were derived has been discontinued. The time saved by this and other minor changes in the receiving room has enabled the clerical force in that room to keep the work required in handling and recording the large number of packages received for transmission through the service more nearly up to date.

Mention was made in the last report that the German authorities had in contemplation the founding of an institution at Berlin to further cultural relations between Germany and the United States, and that one of its functions would be the transmission and distribution of German exchanges. This establishment, which is known as the "Amerika-Institut," was organized in the fall of 1910, and the exchange of publications was taken up by it on January 1, 1911. On the latter date the exchange agency maintained by the Smithsonian Institution in Leipzig at the publishing house of Karl W. Hiersemann was discontinued.

Prior to the discontinuance of the Leipzig agency the interchange of publications between correspondents in Luxemburg and Roumania and those in the United States was conducted through that medium. In compliance with the Institution's request, the Amerika-Institut has been good enough to assume charge of the distribution of packages in Luxemburg. The Academia Romana at Bucharest—the depository of a partial set of United States governmental documents—has been approached with a view to enlisting its services in the interchange of publications between Roumania and the United States, and it is hoped that the academy may find it convenient to have this work conducted under its auspices.

The Japanese exchange agency and the depository of a full set of United States governmental documents was transferred by the Japanese Government, during the latter part of the year, from the Department of Foreign Affairs to

the Imperial Library at Tokyo. The regular series of official documents, as well as all publications for distribution in Japan, are therefore now forwarded to that library.

An application received by the Institution from the under secretary to the Government of the United Provinces of Agra and Oudh, Allahabad, India, for copies of such United States official publications as might be of interest to it was favorably acted upon by the Library of Congress, and that Government was added to the list of those countries receiving partial sets of governmental documents. The first shipment, consisting of six boxes, was forwarded to the under secretary on October 11, 1910.

Two cases forwarded from Washington in October, 1910, containing exchanges for miscellaneous addresses in New South Wales, were destroyed in transit to that country, the steamship by which the consignment was transmitted having been burned at sea. The senders of the packages contained in these cases were communicated with, and it is gratifying to state that it was possible for most of them to supply copies of the lost publications.

The work inaugurated in 1908 of actively seeking returns from foreign countries for the exchanges sent to them by this Government has resulted during the year in the acquisition of important collections of publications for the Library of Congress and for several other establishments of the Government.

About 10,000 foreign governmental documents of a statistical character, returned by the Library of Congress as duplicates, have been stored for some time in the Smithsonian Institution. These books were arranged and listed during the year under the direction of the assistant librarian, while the Exchange Service, through which the documents were received from abroad, provided the extra clerical assistance required. Upon completion of this work most of the documents were forwarded to the New York Public Library to complete its series of foreign governmental publications.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

In accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901, setting apart a certain number of documents for exchange with foreign countries, there are now sent regularly to depositories abroad 55 full sets of United States official publications and 34 partial sets, the United Provinces of Agra and Oudh having been added during the year to the list of countries receiving partial sets.

The recipients of full and partial sets are as follows:

DEPOSITORIES OF FULL SETS.

- Argentina: Ministerio de Relaciones Exteriores, Buenos Aires.
- Argentina: Biblioteca de la Universidad Nacional de La Plata.
- Australia: Library of the Commonwealth Parliament, Melbourne.
- Austria: K. K. Statistische Central-Commission, Vienna.
- Baden: Universitäts-Bibliothek, Freiburg.
- Bavaria: Königliche Hof- und Staats-Bibliothek, Munich.
- Belgium: Bibliothèque Royale, Brussels.
- Brazil: Bibliotheca Nacional, Rio de Janeiro.
- Canada: Parliamentary Library, Ottawa.
- Cape Colony: Government Stationery Department, Cape Town.
- Chile: Biblioteca del Congreso Nacional, Santiago.
- China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
- Colombia: Biblioteca Nacional, Bogota.
- Costa Rica: Oficina de Depósito y Canje de Publicaciones, San José.

Cuba: Secretaria de Estado (Asuntos Generales y Canje Internacional), Habana.

Denmark: Kongelige Bibliotheket, Copenhagen.

England: British Museum, London.

England: London School of Economics and Political Science, London.

France: Bibliothèque Nationale, Paris.

France: Préfecture de la Seine, Paris.

Germany: Deutsche Reichstags-Bibliothek, Berlin.

Greece: Bibliothèque Nationale, Athens.

Haiti: Secrétairerie d'État des Relations Extérieures, Port au Prince.

Hungary: Hungarian House of Delegates, Budapest.

India: Department of Education (Books), Government of India, Calcutta.

Ireland: National Library of Ireland, Dublin.

Italy: Biblioteca Nazionale Vittorio Emanuele, Rome.

Japan: Imperial Library of Japan, Tokyo.

Manitoba: Provincial Library, Winnipeg.

Mexico: Instituto Bibliográfico, Biblioteca Nacional, Mexico.

Netherlands: Library of the States General, The Hague.

New South Wales: Board for International Exchanges, Sydney.

New Zealand: General Assembly Library, Wellington.

Norway: Stortingets Bibliothek, Christiania.

Ontario: Legislative Library, Toronto.

Peru: Biblioteca Nacional, Lima.

Portugal: Bibliotheca Nacional, Lisbon.

Prussia: Königliche Bibliothek, Berlin.

Quebec: Legislative Library, Quebec.

Queensland: Parliamentary Library, Brisbane.

Russia: Imperial Public Library, St. Petersburg.

Saxony: Königliche Oeffentliche Bibliothek, Dresden.

Servia: Section Administrative du Ministère des Affaires Étrangères, Belgrade.

South Australia: Parliamentary Library, Adelaide.

Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.

Sweden: Kungliga Biblioteket, Stockholm.

Switzerland: Bibliothèque Fédérale, Berne.

Tasmania: Parliamentary Library, Hobart.

Transvaal: Government Library, Pretoria.

Turkey: Department of Public Instruction, Constantinople.

Uruguay: Oficina de Canje Internacional de Publicaciones, Montevideo.

Venezuela: Biblioteca Nacional, Caracas.

Victoria: Public Library, Melbourne.

Western Australia: Public Library of Western Australia, Perth.

Württemberg: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

Alberta: Legislative Library, Edmonton.

Alsace-Lorraine: K. Ministerium für Elsass-Lothringen, Strassburg.

Bolivia: Ministerio de Colonización y Agricultura, La Paz.

Bremen: Senatskommission für Reichs- und Auswärtige Angelegenheiten.

British Columbia: Legislative Library, Victoria.

Bulgaria: Minister of Foreign Affairs, Sofia.

Ceylon: United States Consul, Colombo.

Ecuador: Biblioteca Nacional, Quito.

Egypt: Bibliothèque Khédiviale, Cairo.
Guatemala: Secretary of the Government, Guatemala.
Hamburg: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
Hesse: Grossherzogliche Hof-Bibliothek, Darmstadt.
Honduras: Secretary of the Government, Tegucigalpa.
Jamaica: Colonial Secretary, Kingston.
Liberia: Department of State, Monrovia.
Lourenço Marquez: Government Library, Lourenço Marquez.
Malta: Lieutenant-Governor, Valetta.
Montenegro: Ministère des Affaires Étrangères, Cetinje.
Natal: Colonial Secretary's Office, Pietermaritzburg.
New Brunswick: Legislative Library, St. John.
Newfoundland: Colonial Secretary, St. John's.
Nicaragua: Superintendente de Archivos Nacionales, Managua.
Northwest Territories: Government Library, Regina.
Nova Scotia: Provincial Secretary of Nova Scotia, Halifax.
Orange River Colony: Government Library, Bloemfontein.
Panama: Secretaría de Relaciones Exteriores, Panama.
Paraguay: Oficina General de Informaciones y Canjes y Comisaría General de Inmigración, Asuncion.
Prince Edward Island: Legislative Library, Charlottetown.
Roumania: Academia Romana, Bucarest.
Salvador: Ministerio de Relaciones Exteriores, San Salvador.
Siam: Department of Foreign Affairs, Bangkok.
Straits Settlements: Colonial Secretary, Singapore.
United Provinces of Agra and Oudh: under Secretary to Government, Allahabad.
Vienna: Bürgermeister der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF THE OFFICIAL JOURNAL,

As mentioned in previous reports, a resolution of the Congress was approved March 4, 1900, setting aside such number as might be required, not exceeding 100 copies, of the daily issue of the Congressional Record for exchange, through the agency of the Smithsonian Institution, with the legislative chambers of such foreign governments as might agree to send to the United States in return current copies of their parliamentary record or like publication. The purpose of this resolution was to enable the Institution, on the part of the United States, to more fully carry into effect the provisions of the convention concluded at Brussels in 1886, providing for the immediate exchange of the official journal.

The Governments of the Argentine Republic, Denmark, and Great Britain have entered into this exchange during the year. A complete list of the countries to which the Congressional Record is now sent is given below:

Argentine Republic.	France.	Prussia.
Australia.	Great Britain.	Roumania.
Austria.	Greece.	Russia.
Baden.	Guatemala.	Servia.
Belgium.	Honduras.	Spain.
Brazil.	Hungary.	Switzerland.
Canada.	Italy.	Transvaal.
Cape of Good Hope.	New South Wales.	Uruguay.
Cuba.	New Zealand.	Western Australia.
Denmark.	Portugal.	

There are at present 29 countries with which the immediate exchange of the official journal is carried on. To some of these countries two copies of the Congressional Record are sent—one to the upper and one to the lower house of parliament—the total number transmitted being 34.

It may be repeated in this connection that the exchange here alluded to is separate and distinct from the exchange of official documents which has existed between the United States and other countries for many years. It is interparliamentary, and provides for the immediate transmission, direct by mail, of the official journal as soon as published.

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of bureaus or agencies through which the distribution of exchanges is effected. Those in the larger and many in the smaller countries forward to the Smithsonian Institution, in return, contributions for distribution in the United States:

Algeria, via France.

Angola, via Portugal.

Argentina: Comisión Protectora de Bibliotecas Populares, Reconquista 538, Buenos Aires.

Austria: K. K. Statistische Central-Commission, Vienna.

Azores, via Portugal.

Barbados: Imperial Department of Agriculture, Bridgetown.

Belgium: Service Belge des Échanges Internationaux, Rue du Musée 5, Brussels.

Bolivia: Oficina Nacional de Estadística, La Paz.

Brazil: Serviço de Permutações Internacionais, Bibliotheca Nacional, Rio de Janeiro.

British Colonies: Crown Agents for the Colonies, London.¹

British Guiana: Royal Agricultural and Commercial Society, Georgetown.

British Honduras: Colonial Secretary, Belize.

Bulgaria: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.

Canary Islands, via Spain.

Cape Colony: Government Stationery Department, Cape Town.

Chile: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

China: Zi-ka-wei Observatory, Shanghai.

Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogota.

Costa Rica: Oficina de Depósito y Canje de Publicaciones, San José.

Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.

Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.

Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Director-General, Survey Department, Giza (Mudiria).

France: Service Français des Echanges Internationaux, 110 Rue de Grenelle, Paris.

Germany: Amerika-Institut, Berlin, N. W. 7.

Great Britain and Ireland: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

Greece: Bibliothèque Nationale, Athens.

Greenland, via Denmark.

¹ This method is employed for communicating with several of the British colonies with which no medium is available for forwarding exchanges direct.

- Guadeloupe, via France.
- Guatemala: Instituto Nacional de Varones, Guatemala.
- Guinea, via Portugal.
- Haiti: Secrétaire d'Etat des Relations Extérieures, Port au Prince.
- Honduras: Biblioteca Nacional, Tegucigalpa.
- Hungary: Dr. Julius Pikler, Municipal Office of Statistics, City Hall, Budapest.
- Iceland, via Denmark.
- India: India Store Department, India Office, London.
- Italy: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.
- Jamaica: Institute of Jamaica, Kingston.
- Japan: Imperial Library of Japan, Tokyo.
- Java, via Netherlands.
- Korea: His Imperial Japanese Majesty's Residency-General, Seoul.
- Liberia: Department of State, Monrovia.
- Lourenço Marquez: Government Library, Lourenço Marquez.
- Luxemburg, via Germany.
- Madagascar, via France.
- Madeira, via Portugal.
- Montenegro: Ministère des Affaires Étrangères, Cetinje.
- Mozambique, via Portugal.
- Natal: Agent-General for Natal, London.
- Netherlands: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.
- New Guinea, via Netherlands.
- New South Wales: Board for International Exchanges, Public Library, Sydney.
- New Zealand: Dominion Museum, Wellington.
- Nicaragua: Ministerio de Relaciones Exteriores, Managua.
- Norway: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.
- Panama: Secretaria de Relaciones Exteriores, Panama.
- Paraguay: Ministerio de Relaciones Exteriores, Asuncion.
- Persia: Board of Foreign Missions of the Presbyterian Church, New York City.
- Peru: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
- Portugal: Serviço de Permutações Internacionais, Bibliotheca Nacional, Lisbon.
- Queensland: Board of Exchanges of International Publications, Parliament House, Brisbane.
- Russia: Commission Russe des Echanges Internationaux, Bibliothèque Impériale Publique, St. Petersburg.
- Salvador: Ministerio de Relaciones Exteriores, San Salvador.
- Servia: Section Administrative du Ministère des Affaires Etrangères, Belgrade.
- Siam: Department of Foreign Affairs, Bangkok.
- South Australia: Public Library of South Australia, Adelaide.
- Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
- Sumatra, via Netherlands.
- Sweden: Kongliga Svenska Vetenskaps Akademien, Stockholm.
- Switzerland: Service des Echanges Internationaux, Bibliothèque Fédérale Centrale, Bern.
- Syria: Board of Foreign Missions of the Presbyterian Church, New York.
- Tasmania: Royal Society of Tasmania, Hobart.
- Transvaal: Government Library, Pretoria.

Trinidad: Victoria Institute, Port of Spain.

Tunis, via France.

Turkey: American Board of Commissioners for Foreign Missions, Boston.

Uruguay: Oficina de Canje Internacional, Montevideo.

Venezuela: Biblioteca Nacional, Caracas.

Victoria: Public Library of Victoria, Melbourne.

Western Australia: Public Library of Western Australia, Perth.

I may add here, as a matter of record, that I was appointed assistant secretary in charge of Library and Exchanges on June 1, 1911.

Respectfully submitted.

F. W. TRUE,

Assistant Secretary in Charge of Library and Exchanges.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX IV.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to present herewith a report of the operations of the National Zoological Park for the fiscal year ending June 30, 1911.

The general appropriation made by Congress for that year was \$100,000, and in addition to this an appropriation of \$15,000 was made for roads and walks.

The cost of maintenance was \$31,325, and the amount remaining from the general appropriation, \$13,675, was expended in various improvements and repairs.

ACCESSIONS.

Among the important accessions of the year were a pair of Haytian solenodons, a rare insectivorous mammal, presented by Mr. and Mrs. Franklin Adams of the Pan American Union. A pair of northern fur seals was received from the United States Bureau of Fisheries, a fine female grizzly bear from Maj. H. C. Benson, acting superintendent of the Yellowstone National Park, and four Virginia deer from Gen. Joseph S. Smith, manager of the National Soldiers Home, Bangor, Maine. By purchase, the park obtained a hippopotamus, an East African buffalo, three prong-horn antelopes, a pair of reindeer, a large Asiatic macaque monkey, and various other animals. Some important animals were also obtained by exchange, as noted below. The accessions included about twenty species not before represented in the collection.

Early in its history the park exhibited for two years a hippopotamus which had been received as a loan. Since that was withdrawn the species has not been represented in the collection. The present animal, a female about 2 years old, is from East Africa and weighs 850 pounds. The buffalo was captured in German East Africa and is believed to be the form described as *Buffelus neumanni*. The African buffalo has for some time been rather difficult to obtain, and the park was fortunate in being able to secure a specimen at comparatively small cost. It was also fortunate in obtaining in western Texas a male and two female prong-horn antelopes, all adult, from which two vigorous young have been born. Through an animal dealer on the Pacific coast the large brown macaque monkey of southeastern Asia and several other species new to the collection were obtained which had not been procurable elsewhere.

EXCHANGES.

Surplus animals were disposed of by exchange as usual, in accordance with the terms of the act establishing the park. They were sent to the New York Zoological Park, the London Zoological Garden, and various dealers and private individuals. In return for these, the park secured a number of important animals, including a fine specimen each of bontebok, blessingbok, and springbok, a small anteater, a pair of tenrecs (insectivorous mammals of Madagascar), and other mammals and birds. The bontebok and blessingbok, which are very beautiful African antelopes, are especially valued, as the former now exists only in a few

semiwild herds in Cape Colony, 300 individuals, perhaps, remaining from the "thousands upon thousands" described by early hunters in South Africa, while the latter has been greatly reduced in numbers.

Whenever possible, direct exchange was made, but where the person who desired to obtain an animal from the park had nothing acceptable to offer, the exchange was effected through some one of the responsible dealers in animals.

Black-crowned night herons had bred so freely in the flying cage that it became a necessity to materially reduce their number and some were sent (as gifts) to the New York Zoological Park, London Zoological Garden, and the park departments of St. Louis and Rochester.

Animals in the collection June 30, 1911.

MAMMALS.

Grivet monkey (<i>Cercopithecus sabæus</i>)	1	American badger (<i>Taxidea americana</i>)	4
Green monkey (<i>Cercopithecus callitrichus</i>)	1	Common skunk (<i>Mephitis mephitis</i>)	2
Mona monkey (<i>Cercopithecus mona</i>)	2	Wolverine (<i>Gulo luscus</i>)	1
Diana monkey (<i>Cercopithecus diana</i>)	1	American marten (<i>Mustela americana</i>)	2
Sooty mangabey (<i>Cercocebus fuliginosus</i>)	2	Fisher (<i>Mustela pennanti</i>)	1
White-collared mangabey (<i>Cercocebus collaris</i>)	1	Common ferret (<i>Putorius putorius</i>)	1
Bonnet monkey (<i>Macacus sinicus</i>)	1	Black-footed ferret (<i>Putorius nigripes</i>)	3
Macaque monkey (<i>Macacus cynomolgus</i>)	5	North American otter (<i>Lutra canadensis</i>)	5
Pig-tailed monkey (<i>Macacus nemestrinus</i>)	3	Eskimo dog (<i>Canis familiaris</i>)	2
Rhesus monkey (<i>Macacus rhesus</i>)	15	Dingo (<i>Canis dingo</i>)	4
Brown macaque (<i>Macacus arctoides</i>)	4	Gray wolf (<i>Canis occidentalis</i>)	6
Japanese monkey (<i>Macacus fuscatus</i>)	4	Black wolf (<i>Canis occidentalis</i>)	1
Formosan rock-macaque (<i>Macacus cyclops</i>)	1	Coyote (<i>Canis latrans</i>)	4
Black ape (<i>Cynopithecus niger</i>)	1	Woodhouse's coyote (<i>Canis frustror</i>)	5
Anubis baboon (<i>Papio anubis</i>)	1	Crab-eating dog (<i>Canis cancrivorus</i>)	1
East African baboon (<i>Papio cynocephalus</i>)	1	Red fox (<i>Vulpes pennsylvanicus</i>)	4
Chacma (<i>Papio porcarius</i>)	1	Swift fox (<i>Vulpes velox</i>)	2
Mandrill (<i>Papio maimon</i>)	4	Arctic fox (<i>Vulpes lagopus</i>)	2
Drill (<i>Papio leucophaeus</i>)	1	Gray fox (<i>Urocyon cinereo-argenteus</i>)	6
Gray spider monkey (<i>Ateles geoffroyi</i>)	1	Striped hyena (<i>Hyæna striata</i>)	1
White-throated capuchin monkey (<i>Cebus hypoleucus</i>)	3	African palm civet (<i>Viverra civetta</i>)	1
Brown monkey (<i>Cebus fatuellus</i>)	3	Common genet (<i>Genetta genetia</i>)	2
Weeper monkey (<i>Cebus capucinus</i>)	1	Sudan lion (<i>Felis leo</i>)	8
Ruffed lemur (<i>Lemur varius</i>)	1	Killmanjaro lion (<i>Felis leo sabakiensis</i>)	5
Ring-tailed lemur (<i>Lemur catta</i>)	2	Tiger (<i>Felis tigris</i>)	2
Tenrec (<i>Centetes ecaudatus</i>)	2	Cougar (<i>Felis oregonensis hippolestes</i>)	2
Polar bear (<i>Thalarctos maritimus</i>)	3	Jaguar (<i>Felis onca</i>)	1
European brown bear (<i>Ursus arctos</i>)	3	Mexican jaguar (<i>Felis onca goldmani</i>)	1
Kadiak bear (<i>Ursus middendorffi</i>)	1	Leopard (<i>Felis pardus</i>)	2
Yakutat bear (<i>Ursus dalli</i>)	1	Black leopard (<i>Felis pardus</i>)	1
Alaskan brown bear (<i>Ursus gyas</i>)	5	Serval (<i>Felis serval</i>)	1
Kidder's bear (<i>Ursus kidderi</i>)	1	Ocelot (<i>Felis pardalis</i>)	1
Himalayan bear (<i>Ursus thibetanus</i>)	1	Canada lynx (<i>Lynx canadensis</i>)	1
Grizzly bear (<i>Ursus horribilis</i>)	4	Bay lynx (<i>Lynx rufus</i>)	4
Black bear (<i>Ursus americanus</i>)	9	Spotted lynx (<i>Lynx rufus texensis</i>)	1
Cinnamon bear (<i>Ursus americanus</i>)	3	Florida lynx (<i>Lynx rufus floridanus</i>)	1
Sloth bear (<i>Melursus ursinus</i>)	1	Steller's sea lion (<i>Eumetopias stelleri</i>)	1
Kinkajou (<i>Cerculeptes caudivolvulus</i>)	1	California sea lion (<i>Zalophus californianus</i>)	2
Cacomistle (<i>Bassariscus astuta</i>)	1	Harbor seal (<i>Phoca vitulina</i>)	8
Gray coatimundi (<i>Nasua narica</i>)	3	Fox squirrel (<i>Sciurus niger</i>)	10
Raccoon (<i>Procyon lotor</i>)	17	Western fox squirrel (<i>Sciurus ludovicianus</i>)	8
		Gray squirrel (<i>Sciurus carolinensis</i>)	40
		Black squirrel (<i>Sciurus carolinensis</i>)	20
		Prairie dog (<i>Cynomys ludovicianus</i>)	71
		Alpine marmot (<i>Arctomys marmotta</i>)	3

Woodchuck (<i>Arctomys monax</i>)-----	3	Reindeer (<i>Rangifer tarandus</i>)-----	2
American beaver (<i>Castor canadensis</i>)--	4	Virginia deer (<i>Odocoileus virginianus</i>)--	5
Coypu (<i>Myocastor coypus</i>)-----	3	Mule deer (<i>Odocoileus hemionus</i>)-----	2
Hutia-conga (<i>Capromys pilorides</i>)-----	2	Columbian black-tailed deer (<i>Odocoileus columbianus</i>)-----	1
Indian porcupine (<i>Hystrix leucura</i>)-----	2	Cuban deer (<i>Odocoileus</i> sp.)-----	1
Mexican agouti (<i>Dasyprocta mexicana</i>)--	1	Prong-horn antelope (<i>Antilocapra americana</i>)-----	5
Asara's agouti (<i>Dasyprocta azarae</i>)-----	2	Coke's hartebeest (<i>Budalis cokei</i>)-----	2
Golden agouti (<i>Dasyprocta aguti</i>)-----	1	Bontebok (<i>Damaliscus pygargus</i>)-----	1
Hairy-rumped agouti (<i>Dasyprocta prymnolopha</i>)-----	5	Blessbok (<i>Damaliscus albifrons</i>)-----	1
Paca (<i>Calogenys paca</i>)-----	1	White-tailed gnu (<i>Connochaetes gnu</i>)-----	1
Guinea pig (<i>Cavia cutleri</i>)-----	13	Defassa water buck (<i>Oedus defassa</i>)-----	1
Patagonian cavy (<i>Dolichotis patagonica</i>)-----	2	Indian antelope (<i>Antelope cervicapra</i>)-----	3
Domestic rabbit (<i>Lepus cuniculus</i>)-----	41	Springbuck (<i>Antidorcas euchore</i>)-----	1
Cape hyrax (<i>Procavia capensis</i>)-----	2	Grant's gazelle (<i>Gazella granti</i>)-----	1
Indian elephant (<i>Elephas maximus</i>)-----	1	Nilgai (<i>Boselaphus tragocamelus</i>)-----	2
Brazilian tapir (<i>Tapirus americanus</i>)--	2	Congo harnessed antelope (<i>Tragelaphus gratus</i>)-----	3
Grevy's zebra (<i>Equus grevyi</i>)-----	1	East African eland (<i>Oreos canna patersonianus</i>)-----	1
Zebra-donkey hybrid (<i>Equus grevyi-astinus</i>)-----	1	Chamois (<i>Rupicapra tragus</i>)-----	3
Grant's zebra (<i>Equus burchelli granti</i>)--	1	Tahr (<i>Hemitragus jemlaticus</i>)-----	6
Collared peccary (<i>Dicotyles angulatus</i>)--	8	Common goat (<i>Capra hircus</i>)-----	4
Wild boar (<i>Sus scrofa</i>)-----	1	Angora goat (<i>Capra hircus</i>)-----	4
Northern wart hog (<i>Phacochoerus africanus</i>)-----	2	Barbary sheep (<i>Ovis tragelaphus</i>)-----	13
Hippopotamus (<i>Hippopotamus amphibius</i>)-----	1	Barbados sheep (<i>Ovis aries-tragelaphus</i>)-----	1
Guanaco (<i>Lama huanachus</i>)-----	3	Anoa (<i>Anoa depressicornis</i>)-----	1
Llama (<i>Lama glama</i>)-----	6	East African buffalo (<i>Buffelus neumanni</i>)-----	1
Alpaca (<i>Lama pacos</i>)-----	2	Zebu (<i>Bibos indicus</i>)-----	3
Vicugna (<i>Lama vicugna</i>)-----	2	Yak (<i>Poephagus grunniens</i>)-----	6
Bactrian camel (<i>Camelus bactrianus</i>)--	3	American bison (<i>Bison americanus</i>)-----	12
Muntjac (<i>Cervulus muntjac</i>)-----	1	Hairy armadillo (<i>Dasyurus villosus</i>)-----	2
Sambar deer (<i>Cervus aristotels</i>)-----	1	Wallaroo (<i>Macropus robustus</i>)-----	4
Philippine deer (<i>Cervus philippinus</i>)--	1	Red-necked wallaby (<i>Macropus ruficollis</i>)-----	1
Hog deer (<i>Cervus porcinus</i>)-----	4	Brush-tailed rock kangaroo (<i>Petrogale penicillata</i>)-----	2
Barasingha deer (<i>Cervus duvaucelii</i>)-----	10	Virginia opossum (<i>Didelphys marsupialis</i>)-----	2
Axis deer (<i>Cervus axis</i>)-----	5		
Japanese deer (<i>Cervus sika</i>)-----	9		
Red deer (<i>Cervus elaphus</i>)-----	13		
American elk (<i>Cervus canadensis</i>)-----	9		
Fallow deer (<i>Cervus dama</i>)-----	8		

BIRDS.

European blackbird (<i>Merula merula</i>)-----	1	Whydah weaver (<i>Vidua paradisica</i>)-----	4
Catbird (<i>Dumetella carolinensis</i>)-----	1	Painted bunting (<i>Passerina ciris</i>)-----	2
Brown thrasher (<i>Toxostoma rufum</i>)-----	1	Red-crested cardinal (<i>Paroaria cucullata</i>)-----	10
Japanese robin (<i>Liothrix luteus</i>)-----	2	Common cardinal (<i>Cardinalis cardinalis</i>)-----	1
Laughing thrush (<i>Garrulus leucolophus</i>)-----	2	Rose-breasted grosbeak (<i>Zamelodia ludoviciana</i>)-----	1
Orange-checked waxbill (<i>Estrela melopoda</i>)-----	8	Siskin (<i>Spinus spinus</i>)-----	2
Cordon-bleu (<i>Estrela phaeootis</i>)-----	8	European goldfinch (<i>Carduelis elegans</i>)-----	1
Cut-throat finch (<i>Amadina fasciata</i>)-----	4	Yellow hammer (<i>Emberiza citrinella</i>)-----	2
Zebra finch (<i>Amadina castanotis</i>)-----	2	Common canary (<i>Serinus canarius</i>)-----	12
Black-headed finch (<i>Munia atricapilla</i>)-----	2	Bullfinch (<i>Pyrrhula europaea</i>)-----	13
White-headed finch (<i>Munia maja</i>)-----	5	Cowbird (<i>Molothrus ater</i>)-----	1
Nutmeg finch (<i>Munia punctularia</i>)-----	4	Purple grackle (<i>Quiscalus quiscula</i>)-----	1
Java sparrow (<i>Munia oryzivora</i>)-----	10	Red-winged blackbird (<i>Agelaius phoeniceus</i>)-----	2
White Java sparrow (<i>Munia oryzivora</i>)-----	6	Common mynah (<i>Acridotheres tristis</i>)-----	1
Parson finch (<i>Poephila cincta</i>)-----	1	European raven (<i>Corvus corax</i>)-----	1
Bearded finch (<i>Spermophila</i> sp.)-----	2	American raven (<i>Corvus corax sinuatus</i>)-----	1
Madagascar weaver (<i>Foudia madagascariensis</i>)-----	4	Blue jay (<i>Cyanocitta cristata</i>)-----	3
Red-billed weaver (<i>Quelea quelea</i>)-----	8		

European magpie (<i>Pica pica</i>)-----	1	Red-shouldered hawk (<i>Buteo lineatus</i>)--	1
American magpie (<i>Pica pica hudsonica</i>)-----	2	Sharp-shinned hawk (<i>Accipiter velox</i>)--	1
Piping crow (<i>Gymnokitta tibicen</i>)-----	2	Venezuelan hawk-----	1
Giant kingfisher (<i>Dacelo gigas</i>)-----	1	Caracara (<i>Polyborus cheriway</i>)-----	2
Sulphur-crested cockatoo (<i>Cacatua galerita</i>)-----	3	Lammergeyer (<i>Gypaetus barbatus</i>)-----	1
White cockatoo (<i>Cacatua alba</i>)-----	6	South American condor (<i>Sarcorhamphus gryphus</i>)-----	2
Leadbeater's cockatoo (<i>Cacatua leadbeateri</i>)-----	1	California condor (<i>Gymnogyps californianus</i>)-----	2
Bare-eyed cockatoo (<i>Cacatua gymnotops</i>)-----	2	Griffon vulture (<i>Gyps fulvus</i>)-----	2
Roseate cockatoo (<i>Cacatua roseicapilla</i>)-----	8	Egyptian vulture (<i>Neophron percnopterus</i>)-----	1
Gang-gang cockatoo (<i>Callocephalon falcatum</i>)-----	1	Pileated vulture (<i>Neophron pileatus</i>)--	1
Yellow and blue macaw (<i>Ara ararauna</i>)-----	2	Turkey vulture (<i>Cathartes aura</i>)-----	5
Red and yellow and blue macaw (<i>Ara macao</i>)-----	3	Black vulture (<i>Cathartes urubti</i>)-----	1
Red and blue macaw (<i>Ara chloroptera</i>)-----	3	King vulture (<i>Gypagus papa</i>)-----	1
Great green macaw (<i>Ara militaris</i>)-----	1	Ring dove (<i>Columba palumbus</i>)-----	17
Kea (<i>Nestor notabilis</i>)-----	1	Red-billed pigeon (<i>Columba flaviventris</i>)-----	4
Mexican conure (<i>Conurus holochlorus</i>)-----	1	Mourning dove (<i>Zenaidura macroura</i>)--	9
Carolina parakeet (<i>Conuropsis carolinensis</i>)-----	2	Peaceful dove (<i>Geopelia tranquilla</i>)--	2
Tovi parakeet (<i>Brotogeris jugularis</i>)-----	1	Cape dove (<i>Gena capensis</i>)-----	2
Cuban parrot (<i>Amazona leucocephala</i>)-----	2	Crested pigeon (<i>Ocyphaps lophotes</i>)-----	1
Orange-winged amazon (<i>Amazona amazonica</i>)-----	1	Chachalaca (<i>Ortalis vetula</i>)-----	3
Porto Rican amazon (<i>Amazona vittata</i>)-----	1	Purplish guan (<i>Penelope purpurascens</i>)-----	1
Yellow-shouldered amazon (<i>Amazona ochroptera</i>)-----	2	Mexican curassow (<i>Crax globicera</i>)-----	2
Yellow-fronted amazon (<i>Amazona ochrocephala</i>)-----	2	Chapman's curassow (<i>Crax chapmani</i>)--	1
Yellow-headed amazon (<i>Amazona levillanti</i>)-----	1	Daubenton's curassow (<i>Crax daubentoni</i>)-----	1
Lesser vasa parrot (<i>Coracopsis nigra</i>)-----	2	Wild turkey (<i>Meleagris gallopavo silvestris</i>)-----	18
Pigeon parakeet (<i>Palæornis columboides</i>)-----	1	Peafowl (<i>Pavo cristata</i>)-----	37
Love bird (<i>Agapornis pullaria</i>)-----	3	Jungle fowl (<i>Gallus bankiva</i>)-----	1
Green parakeet (<i>Loriculus</i> sp.)-----	2	Reeves's pheasant (<i>Phasianus reevesi</i>)--	1
Pennant's parakeet (<i>Platyercus elegans</i>)-----	1	Golden pheasant (<i>Thaumalea picta</i>)-----	1
Pale-headed parakeet (<i>Platyercus pallidiceps</i>)-----	1	Silver pheasant (<i>Euplocamus nycthemerus</i>)-----	2
Shell parakeet (<i>Melospittacus undulatus</i>)-----	1	Black cock (<i>Lyrurus tetrix</i>)-----	1
Great horned owl (<i>Bubo virginianus</i>)--	13	European quail (<i>Coturnix communis</i>)--	1
Arctic horned owl (<i>Bubo virginianus subarcticus</i>)-----	2	Hungarian partridge (<i>Perdix perdix</i>)--	3
Screech owl (<i>Otus asio</i>)-----	2	Bobwhite (<i>Colinus virginianus</i>)-----	1
Barred owl (<i>Strix varia</i>)-----	2	Mountain quail (<i>Oreortyx picta</i>)-----	4
Barn owl (<i>Aluco pratincola</i>)-----	1	Scaled quail (<i>Callipepla squamata</i>)--	2
Sparrow hawk (<i>Falco sparverius</i>)-----	1	California quail (<i>Lophortyx californica</i>)-----	1
Bald eagle (<i>Haliaeetus leucocephalus</i>)--	13	Massena quail (<i>Cyrtonyx montezumæ</i>)--	10
Alaskan bald eagle (<i>Haliaeetus leucocephalus alascanus</i>)-----	1	Purple gallinule (<i>Porphyrio cærulea</i>)--	1
Short-tailed eagle (<i>Terathopus ecaudatus</i>)-----	1	Black-backed gallinule (<i>Porphyrio melanotus</i>)-----	2
Harpy eagle (<i>Thrasaetus harpyia</i>)-----	1	American coot (<i>Fulica americana</i>)-----	11
Crowned hawk eagle (<i>Spizaetus coronatus</i>)-----	1	Flightless rail (<i>Ocydromus australis</i>)--	2
East African hawk (<i>Buteo</i> sp.)-----	1	Common carlama (<i>Carlama cristata</i>)--	1
Red-tailed hawk (<i>Buteo borealis</i>)-----	2	Demoiselle crane (<i>Anthropoides virgo</i>)--	2
		Crowned crane (<i>Balearica pavonina</i>)--	2
		Sandhill crane (<i>Grus mexicana</i>)-----	2
		Australian crane (<i>Grus australasiana</i>)-----	1
		Indian white crane (<i>Grus leucogeranus</i>)-----	2
		Thick-knee (<i>Edionemus gallinarius</i>)--	1
		Ruff (<i>Macetes pugnax</i>)-----	4
		Black-crowned night heron (<i>Nycticorax nycticorax naevius</i>)-----	31
		Little blue heron (<i>Florida cærulea</i>)--	1
		Louisiana heron (<i>Hydranassa tricolor rusticollis</i>)-----	1

Reddish egret (<i>Dichromanassa rufescens</i>)	3	American white-fronted goose (<i>Anser albifrons gambeli</i>)	6
Snowy egret (<i>Egretta canadensis</i>)	4	Chinese goose (<i>Anser cygnoides</i>)	3
Great white heron (<i>Herodias egretta</i>)	1	Red-headed duck (<i>Marila americana</i>)	2
Great blue heron (<i>Ardea herodias</i>)	4	Wood duck (<i>Aix sponsa</i>)	12
Boat-bill (<i>Cancroma cochlearia</i>)	2	Mandarin duck (<i>Dendrocygna galericulata</i>)	8
Black stork (<i>Ciconia nigra</i>)	1	Pintail (<i>Dafila acuta</i>)	6
White stork (<i>Ciconia ciconia</i>)	2	Shoveler duck (<i>Spatula clypeata</i>)	3
Marabou stork (<i>Leptoptilus dubius</i>)	1	Blue-winged teal (<i>Querquedula discors</i>)	1
Wood ibis (<i>Mycteria americana</i>)	2	Green-winged teal (<i>Nettion carolinense</i>)	1
Sacred ibis (<i>Ibis ethiopica</i>)	4	Black duck (<i>Anas rubripes</i>)	2
White ibis (<i>Guara alba</i>)	21	Mallard (<i>Anas platyrhynchos</i>)	13
Roseate spoonbill (<i>Ajaja ajaja</i>)	3	American white pelican (<i>Pelecanus erythrorhynchos</i>)	4
European flamingo (<i>Phenicopterus antiquorum</i>)	6	European white pelican (<i>Pelecanus onocrotalus</i>)	2
Trumpeter swan (<i>Olor buccinator</i>)	2	Roseate pelican (<i>Pelecanus roseus</i>)	1
Whistling swan (<i>Olor columbianus</i>)	2	Brown pelican (<i>Pelecanus occidentalis</i>)	4
Mute swan (<i>Cygnus gibbus</i>)	2	Black-backed gull (<i>Larus marinus</i>)	1
Muscovy duck (<i>Cairina moschata</i>)	2	Herring gull (<i>Larus argentatus</i>)	1
White muscovy duck (<i>Cairina moschata</i>)	3	American herring gull (<i>Larus argentatus smithsonianus</i>)	6
Wandering tree-duck (<i>Dendrocygna arcuata</i>)	7	Laughing gull (<i>Larus striatilla</i>)	3
Fulvous tree-duck (<i>Dendrocygna bicolor</i>)	2	Gannet (<i>Sula bassana</i>)	1
Australian wood-duck (<i>Chenonetta jubata</i>)	1	Florida cormorant (<i>Phalacrocorax auritus floridanus</i>)	8
Egyptian goose (<i>Chenalopex aegyptiacus</i>)	1	Mexican cormorant (<i>Phalacrocorax viqua mexicanus</i>)	1
Brant (<i>Branta bernicla glaucogastra</i>)	1	Water turkey (<i>Anhinga anhinga</i>)	6
Canada goose (<i>Branta canadensis</i>)	8	Somali ostrich (<i>Struthio molybdophanes</i>)	1
Hutchins's goose (<i>Branta canadensis hutchinsii</i>)	4	Common cassowary (<i>Casuarus galeatus</i>)	1
Lesser snow goose (<i>Chen hyperboreus</i>)	2	Common rhea (<i>Rhea americana</i>)	3
Greater snow goose (<i>Chen hyperboreus nivalis</i>)	1	Emu (<i>Dromaeus nova hollandiae</i>)	1

REPTILES.

Alligator (<i>Alligator mississippiensis</i>)	16	Spreading adder (<i>Heterodon platyrhinus</i>)	2
Painted turtle (<i>Chrysemys picta</i>)	4	Green snake (<i>Cyclophis astivus</i>)	1
Diamond-back terrapin (<i>Malacoclemmys palustris</i>)	1	Black snake (<i>Zamenis constrictor</i>)	3
Three-toed box-tortoise (<i>Cistudo triunguis</i>)	6	Coach-whip snake (<i>Zamenis flagellum</i>)	2
Painted box-tortoise (<i>Cistudo ornata</i>)	5	Corn snake (<i>Coluber guttatus</i>)	1
Gopher turtle (<i>Xerobates polyphemus</i>)	1	Common chicken snake (<i>Coluber quadrivittatus</i>)	2
Duncan Island tortoise (<i>Testudo ephippium</i>)	2	Gopher snake (<i>Compsosoma corais ouperli</i>)	1
Albemarle Island tortoise (<i>Testudo vicina</i>)	2	Pine snake (<i>Pityophis melanoleucus</i>)	11
Comb lizard (<i>Ctenosaura</i> sp.)	1	Bull snake (<i>Pityophis sayi</i>)	2
Alligator lizard (<i>Soelopus undulatus</i>)	2	Texas chicken snake (<i>Ophibolus calligaster</i>)	2
Horned lizard (<i>Phrynosoma cornutum</i>)	1	King snake (<i>Ophibolus getulus</i>)	2
Gila monster (<i>Heloderma suspectum</i>)	4	Texas garter snake (<i>Eutania proxima</i>)	1
Green lizard (<i>Lacerta viridis</i>)	1	Water moccasin (<i>Ancistron piscivorus</i>)	1
Anaconda (<i>Eunectes murinus</i>)	2	Copperhead (<i>Ancistron contortrix</i>)	3
Common boa (<i>Boa constrictor</i>)	1	Diamond rattlesnake (<i>Crotalus adamanteus</i>)	4
Antillean boa (<i>Boa divinitioqua</i>)	1	Banded rattlesnake (<i>Crotalus horridus</i>)	2
Cuban tree-boa (<i>Epicrates angulifer</i>)	3		

GIFTS.

Mr. and Mrs. Franklin Adams, Pan American Union, two Haitian solenodons,
Miss M. Alexander, Moorefield, W. Va., a brown Capuchin monkey.

Dr. Paul Bartsch, Washington, D. C., two common crows.
 Frederick Carl, jr., Washington, D. C., two screech owls.
 Miss Catharine Carroll, Washington, D. C., a barn owl.
 E. S. Case, Takoma Park, D. C., three blue jays.
 Miss M. B. Cole, Washington, D. C., an alligator.
 Mrs. Mary F. Crown, Washington, D. C., a yellow-headed Amazon parrot.
 Mrs. R. S. Day, Washington, D. C., a common canary.
 Boris de Street, Washington, D. C., an alligator.
 J. R. Eddy, Lamedeer, Mont., an American badger.
 Mr. Eustis, Leesburg, Va., a red-tailed hawk.
 Dr. Cecil French, Washington, D. C., four Hungarian quail.
 Guy M. Gribble, Buckhannon, W. Va., a red-tailed hawk.
 Jesse Hand, jr., Belleplain, N. J., two king snakes.
 Mr. C. A. Holland, Fenwick, Va., a bittern.
 Clarence Howard, Washington, D. C., a copperhead snake.
 E. C. Howe, Washington, D. C., two alligators.
 W. H. Kelly, Sandusky, Ohio, two bald eagles.
 Mr. Lansdale, Washington, D. C., two common opossums.
 Carvel Leary, Washington, D. C., a guinea pig.
 Miss Frances McMullen, Largo, Fla., an alligator snapping turtle.
 C. W. Marks, Berryville, Va., a black snake.
 S. S. Paschals, Chevy Chase, Md., two zebra finches.
 L. E. Perry, Gorgona, Canal Zone, a spider monkey.
 F. W. Pilling, Washington, D. C., 10 common canaries, a red-crested cardinal
 and 2 white Java sparrows.
 Mrs. J. E. Pleitner, Washington, D. C., a green Amazon parrot.
 N. Schutz, Washington, D. C., a screech owl.
 John B. Smith, Renovo, Pa., a banded rattlesnake.
 Mrs. H. Clay Stewart, Washington, D. C., two common canaries.
 J. P. Taylor, Washington, D. C., a copperhead snake and a black snake.
 Dr. James R. Tubman, Washington, D. C., a great horned owl.
 United States Bureau of Fisheries, two northern fur seals.
 James Worcester, Washington, D. C., an alligator.
 Unknown donors, a hawk, a parrakeet, and a woodchuck.

LOSSES OF ANIMALS.

The most important losses during the year were a pair of clouded leopards, a lion, and a young Alaskan brown bear from parasitism; a leucoryx, a water buck, and a nilgai, from tuberculosis; a female American bison and a caribou, in the collection for 10 years, from peritonitis; two solenodons from septicemia, and two young fur seals from enteritis and heat stroke.

Dead animals, to the number of 142, were transferred to the United States National Museum. Autopsies were made, as usual, by the Pathological Division of the Bureau of Animal Industry, United States Department of Agriculture.¹

¹The causes of death were as follows: Pneumonia, 10; tuberculosis, 8; pulmonary edema, 1; aspergillosis, 7; pseudomembranous tracheitis, 1; enteritis, 9; gastritis, 1; gastroenteritis, 7; pneumoenteritis, 1; intestinal coccidiosis, 7; peritonitis, 6; nephritis, 2; fatty degeneration of liver, 1; parasitism, 3; stomatitis, 2; strangulated hernia, 1; rupture of gizzard, 1; internal hemorrhage, 1; abscess of scrotum, 1; abscess of head, 1; unable to deliver young, 1; duodenitis, 1; colitis, 1; echinococcosis, 1; necrobacillosis, 1; pyosclaneusbacillosis, 1; porocephalosis, 1; septicemia, 3; enterotoxism, 1; cystitis, 1; endocarditis, 1; visceral gout, 1; sarcomatosis, 2; cancer of pouch, 1; leukemia, 1; icterus, 1; impaction, 3; duodenal obstruction, 1; starvation, 2; accidents and injuries, 13; killed because unfit for exhibition, 4; result of autopsy indeterminate, 3; no cause found, 4.

Statement of the collection.

ACCESSIONS DURING THE YEAR.

Presented.....	65
Received from Yellowstone National Park.....	1
Received in exchange.....	13
Lent.....	11
Purchased.....	130
Born and hatched in National Zoological Park.....	115
Total.....	335

SUMMARY.

Animals on hand July 1, 1910.....	1, 424
Accessions during the year.....	335
Total.....	1, 759
Deduct loss (by exchange, death, and returning of animals).....	345
On hand June 30, 1911.....	1, 414

Class.	Species.	Individuals.
Mammals.....	157	636
Birds.....	186	685
Reptiles.....	33	93
Total.....	376	1, 414

VISITORS.

The number of visitors to the park during the year was 521,440, a daily average of 1,428. The largest number in any one month was 95,535, in April, 1911, a daily average for the month of 3,184.

During the year there visited the park 169 schools, Sunday schools, classes, etc., with 4,966 pupils, a monthly average of 414 pupils. This number is an increase over the previous year of 14 schools, 1,083 pupils, and an increase in the monthly average of 90 pupils. While most of the classes were from the District of Columbia, 47 of them were from neighboring States, and classes came from Meriden, Hopedale, Norton, North Attleboro, Clinton, Hudson, and Whitman, Massachusetts; Dover, Peterboro, Lancaster, and Exeter, New Hampshire; Bath, Augusta, Biddeford, Gardiner, and Sanford, Maine; Bellows Falls, Vermont; Raleigh, North Carolina; Middleport (two) and Penn Yan, New York; Waynesburg, Pennsylvania; and Hartford, Connecticut.

IMPROVEMENTS.

A house for zebras, a frame building 35 feet square, was constructed, providing four good-sized stalls with yards attached. This is now occupied by a male Grant's zebra, the male Grevy's zebra, which was returned from the experiment station of the Bureau of Animal Industry at Bethesda, Maryland, after use there in breeding, and a hybrid from the latter animal and a domestic ass.

The existing yards on the west side of the antelope house were too small, and the fences around them, which were of temporary character, had seriously

deteriorated. The construction of new steel fences was begun, inclosing a considerably larger area than the former yards, and was nearly completed by the close of the year. The yards on the north and east sides of the antelope house, which had been begun during the previous year, were completed.

The temporary bird house, which had been in very bad condition, was extensively repaired. New roof covering was put on, and the wooden floor, some of the walls and cages, and much other interior work were renewed.

Some alterations were made in the large cages in the lion house to permit more convenient handling of the animals during feeding and the cleaning of the cages. The woodwork of this portion of the building was also refinished.

The public comfort room for women, which was in a very dilapidated condition, was removed to make way for the yards of the antelope house, and a new comfort room was constructed beneath the outdoor cages of the small mammal house. A small frame building for the same purpose was erected near the Adams Mill Road entrance, that portion of the park being a much frequented resort for women with young children.

A new public comfort room for men was also constructed in the basement of the antelope house, providing permanent conveniences, which are much better and more adequate than have existed heretofore.

The drainage culvert in the beaver valley was extended to the flying cage, a distance of 800 feet, thus providing sewerage, as well as for the carrying away of surface water without the erosion which had occurred previously.

Foundations were laid for cages on the east side of the small mammal house, and a concrete walk was constructed there.

Various small improvements and repairs were made. A cage was built in the lion house with a pool for the young hippopotamus, which was received in May; a paddock with shelter was built for the chamois; an inclosure and pool for fur seals; the condor cage and cage for horned owls were extensively repaired; an inclosure with shelter was built for kangaroos; an additional watch house was built; new wagon scales were set near the shop and coal vault; and the heating conduit and mains from the central heating plant were extended to the elephant house and zebra house.

The cost of this work was:

House for zebras	\$2, 500
New yards on west side of antelope house	1, 775
Completing yards on north and east sides of antelope house	250
Repairs to temporary bird house	1, 000
Alterations and repairs to lion house	600
Cage for hippopotamus	275'
Paddock for chamois	300
Inclosure and pool for fur seals	275
Repairing condor and owl cages	350
Inclosure for kangaroos	75
Extending drainage culvert	1,500
New concrete walk and cage foundations at small mammal house, with retaining walls, etc.	1, 050
Additional watch house	125
Extending heating conduit and mains	400
New wagon scales at shop	250
Accessory comfort room for women	350
Women's comfort room	750
Men's comfort room	750

ROADWAYS AND WALKS.

From the appropriation for reconstructing and repairing roadways and walks 4,770 linear feet, or nine-tenths of a mile of road, was treated, from 10 to 45 feet wide, averaging slightly more than 20 feet, a total of 10,700 square yards. The work varied from merely reshaping and supplying a top layer of stone to furnishing the entire thickness of roadbed material, with considerable excavating and filling in some places where the existing grades were too steep. One thousand six hundred square yards (the "concourse") were finished with tarvia. The work cost from 22 cents to \$1 per square yard, and the total amount expended for roads was \$7,220.

During the year 9,280 linear feet, or 1½ miles, of walks were laid or repaired. They were from 6 to 16 feet wide, or an average width of about 9 feet, comprising in all 9,230 square yards. Of this about 6,500 square yards were old macadam walk, the remainder gravel or dirt walks. A considerable amount of excavation and filling had to be done in certain places in order to secure reasonably uniform grades, and steps were constructed at points where the grade had before been too steep. The walks are of stone macadam, the surface treated with tarvia by the penetration method. The cost of laying them was from 35 cents to 85 cents per square yard. A considerable amount of work had to be done also in providing proper drainage. The total expenditure for walks was \$7,780.

Respectfully submitted.

FRANK BAKER, *Superintendent.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

18308°—SM 1911—5

APPENDIX V.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

Sir: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1911:

EQUIPMENT.

The equipment of the observatory is as follows:

(a) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(b) At Mount Wilson, California, upon a leased plat of ground 100 feet square in horizontal projection, are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters.

There were no important additions to the instrument equipment of the observatory during the year.

In 1909 the Smithsonian Institution, at the expense of the Hodgkins fund, erected on the summit of Mount Whitney, California (height 14,502 feet), a stone and steel house to shelter observers who might apply to the Institution for the use of the house to promote investigations in any branch of science. While this structure is not the actual property of the Astrophysical Observatory, it affords an excellent opportunity for observations in connection with those taken on Mount Wilson.

WORK OF THE YEAR.

In order to thoroughly confirm the results obtained on the summit of Mount Whitney (4,420 meters or 14,502 feet) in 1909, discussed in my last annual report, an expedition again occupied that place in August, 1910. The personnel consisted of the director and Mr. G. F. Marsh, of Lone Pine, California. Nearly all of the equipment for spectrobolometric work had been left on Mount Whitney through the winter and was found in good condition. Additional apparatus for measuring the brightness of the sky by day and by night was carried up by pack train under the care of Mr. Elder, of Lone Pine. The good fortune which had attended the 1909 expedition failed for a moment in 1910, and one mule, carrying the silver-disk pyrheliometer and other loading, rolled off among the rocks and was killed. The pyrheliometer fortunately received no injury.

Solar-constant measurements were made successfully on Mount Whitney in 1910 on three successive days. Mr. Fowle made solar-constant observations

simultaneously on Mount Wilson. I give below the results obtained at Mount Wilson and Mount Whitney in 1909 and 1910:

	Sept. 3, 1909.	Aug. 12, 1910.	Aug. 13, 1910.	Aug. 14, 1910.
Solar constant:				
Mount Wilson.....	1.943	1.943	1.924	1.904
Mount Whitney.....	1.959	1.979	1.933	1.956

Taking the mean of the differences between the results obtained simultaneously at the two stations, it appears that the results obtained on Mount Whitney average 1.4 per cent higher than those obtained on Mount Wilson. But considering that the optical apparatus used on Mount Wilson comprised a silvered glass mirror coelostat, an ultra-violet crown glass prism, and two silvered glass mirrors, while that on Mount Whitney comprised only a quartz prism and two magnalium mirrors, and, furthermore, that the pyrheliometers employed at the two stations were read at very different temperatures, it is probable that the slight difference found between the results may be due wholly to experimental differences and implies no discrepancy due to the difference of altitude between the two stations.

This conclusion seems worth emphasizing. We have now made simultaneously solar-constant determinations at sea level (Washington), at over a mile altitude (Mount Wilson), and again at Mount Wilson, and at nearly 3 miles altitude (Mount Whitney). Although both the quantity and the quality of the solar radiation found at these stations differ very much, neither the "solar constant" nor the distribution of the solar energy in the spectrum outside the atmosphere, as fixed by the wholly independent measurements at these three stations, differs more than would be expected in view of the unavoidable small errors of observation. We seem justified in concluding that we do, in fact, eliminate the effects of atmospheric losses and actually determine the true quantity and quality of the sun's radiation outside the atmosphere as we might do if we could observe in free space with no atmosphere at all to hinder.

Expeditions to Mount Wilson have now been made in 1905, 1906, 1908, 1909, and 1910. The last, like the others, continued from May until November. In the earlier years the observations were not made daily, but in 1908, 1909, and 1910 daily determinations of the solar constant were made when possible. As stated in earlier reports, the results indicate a variability of the sun. In order to show the strength of the argument for this conclusion, I give in the accompanying figure a diagram showing all the "solar constant" values obtained in the first four years of observation (fig. 1).

The "solar constant" results lie between 1.80 and 2.00 calories per square centimeter per minute. I call particular attention to the two later years. It will be noted that successive days' results march step by step regularly from low to high values and the reverse, and that this order of march is not the exception, but almost without exception the rule. This seems to render it highly improbable that the fluctuations are due to accidental error, for such a regularity of fluctuation is incompatible with that supposition. As it has now been shown that the altitude of the observing station is immaterial, at least for altitudes below 3 miles, it seems also reasonable to conclude that the fluctuation is not due to faulty estimates of the losses of radiation in the air. Hence the most probable conclusion is that the sun actually varies from day to

day in its output of radiation within limits of from 5 to 10 per cent in quantity and in irregular periods of from 5 to 10 days. • This conclusion I state tentatively. Before it can be accepted without question it must be confirmed by showing that the results obtained day after day at another equally good station, at a great distance, confirm those obtained simultaneously at Mount Wilson. Such a final test, it is now expected, will be made during the coming fiscal year.

Summary of solar-constant values.

	Wash- ington.	Mount Wilson.					Mount Whitney.	
	1902-1907	1905	1906	1908	1909	1910	1909	1910
Times observed.....	44	59	62	113	95	128	1	3
Mean value.....	1.960	1.925	1.921	1.929	1.896	1.914	1.959	1.956

¹ Other days of observation not yet ready.

General mean, 1.922 calories (15° C.) per square centimeter per minute.

Number of determinations, 405.

Other observations made on Mount Whitney.—Although the main purpose of the Mount Whitney expedition of 1910 was served by proving that the determinations of the solar constant of radiation are independent of the altitude of the observing station, advantage was taken of the unusual opportunity to make several other kinds of observations. Kapteyn's sky photometer was employed there on two successive nights to measure the relative brightness of the different regions of the night sky and to estimate the total quantity of sky illumination per square degree compared with that of a first-magnitude star. Yntema had employed similar apparatus in Holland. He found the average brightness of the Milky Way about two or three times that of nongalactic regions of the sky, such as the north polar region, but that the sky near the horizon was of about the same brightness as the Milky Way. He concluded that the sky at night is illuminated more by some terrestrial sources of light than by the stars.

The results obtained on Mount Whitney at nearly 3 miles elevation agreed in general with those of Yntema. The following is a summary of the principal points. Mean values are given:

Brightness of night sky.

[Polar brightness=1. Mount Whitney, 1909-1910.]

	Galactic latitude.				Near hori- zon.
	0° to ±5°	±15° to ±30°	±45° to ±60°	±60° to ±75°	
Relative brightness.....	2.10	1.25	1.19	1.17	1.40

The total illumination from 1 square degree of polar sky was found to be 0.0746 that of one first-magnitude star in the zenith. It is possible that the fraction just given may be a little too small, owing to a source of error discovered after the observations were ended.

Computations from the Mount Whitney results confirm Yntema's conclusion that the great increase of brightness toward the horizon can not be due to any arrangement of starlight, but must be caused by some terrestrial source of light, perhaps a continuous faint aurora.

Bolometric measurements were made on Mount Whitney to determine the relative radiation of the sky by day in all directions, as compared with the

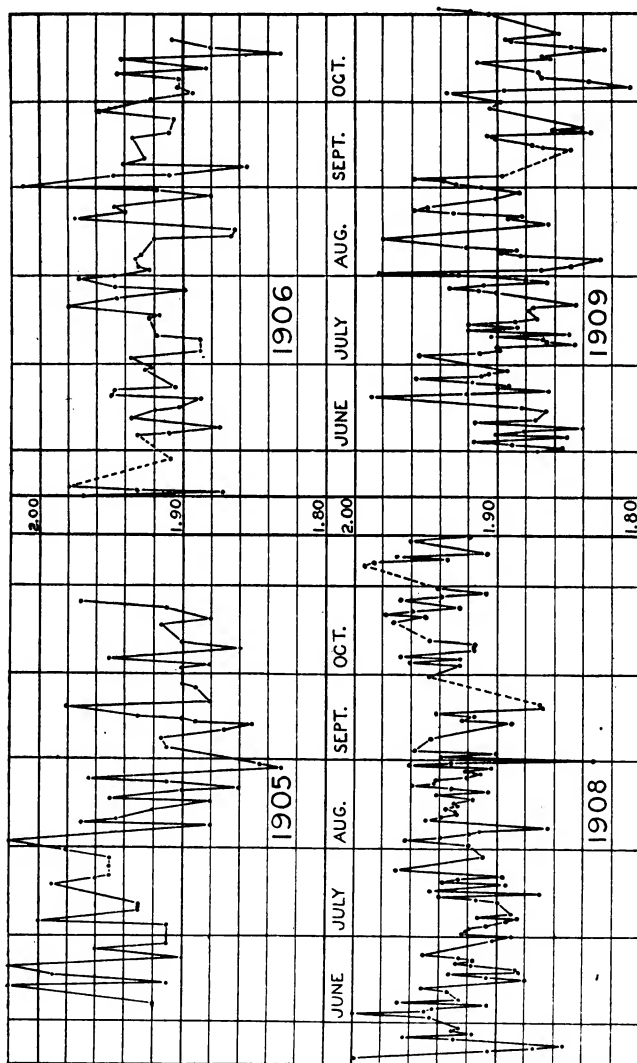


FIG. 1.—Solar constant values.

sun. These measurements were numerous and seem to have been successful, but are not yet reduced.

The sun's energy spectrum.—A summary has been prepared showing the mean result of determinations of the distribution of the sun's energy in the spectrum, as it would be found outside the atmosphere. The measurements on which it is based include Washington, Mount Wilson, and Mount Whitney work of 1903

to 1910, and have been made with many different optical systems. There is great difficulty in getting an accurate estimate of the relative losses suffered by rays of different wave lengths in traversing the spectroscop. Especially is this the case for the violet and ultra-violet rays, where these losses are greatest. The summary has shown that further determinations are needed to fix the distribution in the extreme ultra violet, and observations for this purpose were made in June, 1911, on Mount Wilson, but are not yet reduced. I give below the summary, excluding the work of 1911.

Intensities in normal solar spectrum, outside the atmosphere.

[Observed at Washington, Mount Wilson, Mount Whitney, 1903-1910.]

	μ	μ	μ	μ	μ	μ	μ
Wave length.....	0.30	0.35	0.40	0.45	0.47	0.50	0.60
Intensity.....	440	2,700	4,345	6,047	6,253	6,064	5,047
Probable error (percentage).....	50 (?)	7.3	1.5	1.4	1.8	1.9	2.1
Wave length.....	0.80	1.0	1.3	1.6	2.0	2.5	3.0
Intensity.....	2,672	1,664	897	526	245	43	12
Probable error (percentage).....	1.2	0.7	0.7	1.4	2.4	4.8	45(?)

The sun's temperature.—If we employ the so-called “Wien displacement formula,” which connects the absolute temperature of a perfect radiation with the wave length of its maximum radiation, we may proceed as follows, to estimate the solar temperature, on the assumption that the sun is a perfect radiator:

$$\lambda_{\max} T = 2930.$$

$$\text{If } \lambda_{\max} = 0.470 \mu \text{ then } T = 6230^{\circ} \text{ abs. C.}$$

Another radiation formula is that of Stefan, which connects the total quantity of radiation of a perfect radiator per square centimeter per minute with the absolute temperature. Employing this formula, still assuming the sun to be a perfect radiator, its mean distance 149,560,000 kilometers, its mean diameter 696,000 kilometers, and the mean value of the solar constant of radiation 1.922 calories per square centimeter per minute, we proceed as follows:

$$76.8 \times 10^{-12} \times \left(\frac{696,000}{149,560,000} \right)^2 T^4 = 1.922 \quad T = 5830^{\circ} \text{ abs. C.}$$

A third means of estimating the sun's probable temperature comes from comparisons of the distribution of the energy in its spectrum with that in the spectrum of the perfect radiator, as computed according to the Wien-Planck formula of spectrum energy distribution. The sun's energy curve and that of the perfect radiator at two temperatures are given in the accompanying illustration (fig. 2). It appears at once from this comparison that the sun's radiation differs greatly from that of the perfect radiator at any temperature. The solar radiation is greater in the infra-red spectrum, and much less in the ultra-violet spectrum, than that of perfect radiators giving approximately the same relative spectral distribution as the sun for visible rays. Taking everything in consideration, the solar energy spectrum seems most comparable with that of a perfect radiator between $6,000^{\circ}$ and $7,000^{\circ}$ in absolute temperature.

The causes of the discrepancies we have noted may be several. First, there is the influence of the selective absorption of rays in the Fraunhofer lines.

These lines are much crowded toward and within the ultra-violet spectrum, so that perhaps this indicates a principal reason for the weakness of the sun's spectrum in that region. Second, it seems probable that we are dealing with a mixture of rays from sources at different temperatures. The cause and

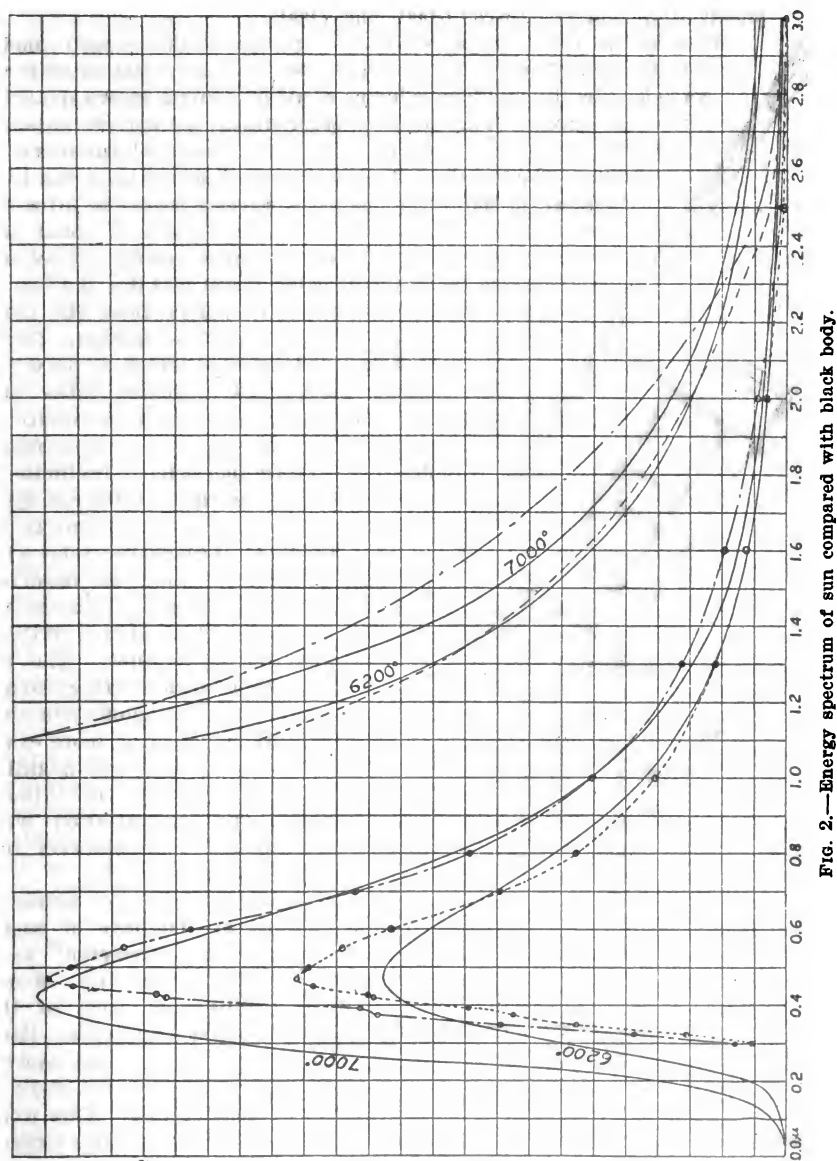


FIG. 2.—Energy spectrum of sun compared with black body.

effect of this difference may each be twofold: For, firstly, at the center of the sun's visible disk we look probably to deeper-lying and hence hotter layers than at the sun's edge, where the line of sight is oblique; and, secondly, since the transmission of the sun's atmosphere is probably like the earth's,

much less for violet and ultra-violet rays than for red and infra-red ones, we probably get infra-red rays from deeper-lying and hence hotter layers in the sun than we do ultra-violet ones.

We conclude that the solar radiation comes from sources ranging in temperature perhaps between the limits $5,000^{\circ}$ and $7,000^{\circ}$ absolute centigrade, but mostly from sources between $6,000^{\circ}$ and $7,000^{\circ}$.

Washington observations.—Further experiments have been made, under Mr. Fowle's direction, on the transmission of radiation of great wave lengths through long columns of air containing known qualities of water vapor. Many of these observations are not yet reduced, so that it is not yet proper to give a numerical summary of results. The length of the column experimented upon has been increased to 800 feet. The measurements cover the infra-red spectrum, from the A line to a wave length of about 17μ .

The observations of the water contents of the air column are made by means of pairs of wet and dry thermometers located at a number of points along the path. The air is thoroughly stirred before readings. Check experiments by Mr. Aldrich, in which he drew the air through phosphorus pentoxide tubes and weighed the water absorbed, have confirmed the accuracy of the water-vapor determinations. Mr. Fowle has made a preliminary comparison of the upper infra-red spectrum bands ρ , σ , τ , ϕ , ψ , and Ω , as

observed through the tube with the same bands as observed through the whole atmosphere at Washington, Mount Wilson, and Mount Whitney. The results are most interesting, though not yet ripe for publication, and will probably lead to more exact knowledge of the total quantity of water vapor in the atmosphere, and its variation with the altitude of the observer and the season of the year.

Reduction of observations.—Upward of 100 days of solar-constant measurements have been made on Mount Wilson on each of the last several years. Each day requires the equivalent of three full days of computation. This work

is being done at Washington by Messrs. Fowle and Aldrich and Miss Graves and certain graphical parts of it by minor clerk Segal. The solar-constant reductions are computed as far as the middle of the observing season of 1910.

Pyrheliometry.—Additional comparisons of the Mount Wilson secondary pyrheliometers have been made with primary standard pyrheliometer No. 3. These are not yet all reduced, but such as have been finished confirm the results of the previous fiscal year, so that we may regard the scale of absolute pyrheli-

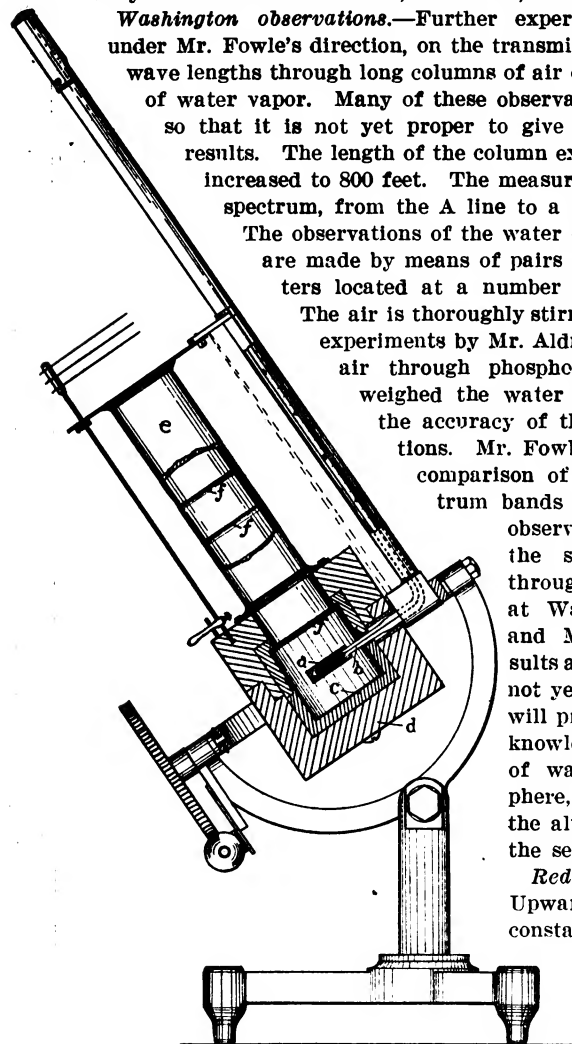


FIG. 3.—Abbot silver disk pyrheliometer.

ometry as now satisfactorily established, and with it the mean value of the solar constant of radiation for the epoch 1905-1910 as fixed at 1.922 calories per square centimeter per minute.

Additional copies of the secondary silver-disk pyrheliometer shown in the accompanying illustration (fig. 3) have been standardized and sent abroad by the Institution as loans or purchases. There have now been sent copies to Russia, Germany, France, Italy, England, Peru, Argentina; and several within the United States, making in all 10 copies now in other hands than ours, besides several now being made to order. The Institution has undertaken the business relating to furnishing these pyrheliometers, which are standardized at the Astrophysical Observatory, to promote exact knowledge of the sun and its possible variability.

SUMMARY.

The year has been distinguished by a successful expedition to Mount Whitney. The results obtained there confirm the view that determinations of the intensity of the solar radiation outside the earth's atmosphere by the spectrobolometric method of high and low sun observation are not dependent on the observer's altitude above sea level, provided the conditions are otherwise good. The Mount Whitney expedition furnished opportunities also for measurements of the brightness of the sky by day and by night, the influence of water vapor on the sun's spectrum, and the distribution of the sun's energy spectrum outside the atmosphere.

Solar-constant observations and closely related researches were continued daily at Mount Wilson until November, 1910, and were taken up again in June, 1911.

Further research tends to confirm the conclusion that the sun's output of radiation varies from day to day in a manner irregular in period and quantity, but roughly running its courses within periods of 5 to 10 days in time and 3 to 10 per cent in amplitude. Assurance seems now complete that this result will be tested in the next fiscal year by long-continued daily observations made simultaneously at two widely separated stations.

Many copies of the silver-disk secondary pyrheliometer have been standardized and sent out to observers in this and foreign countries to promote exactly comparable observations of the sun's radiation.

Measurements of the transparency, for long-wave radiation, of columns of air containing known quantities of water vapor have been continued, and promise highly interesting results.

Respectfully submitted.

C. G. ABBOT, *Director.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX VI.

REPORT ON THE LIBRARY.

SIR: I have the honor to present the following report on the operations of the Library of the Smithsonian Institution for the fiscal year ending June 30, 1911, which was prepared by Mr. Paul Brockett, assistant librarian, who had charge until June 1, 1911.

The following improved methods and consolidation of work have been adopted during the past five years by the Library, in the interest of economy and efficiency:

The catalogue has been modified so as to include the author and donor cards and all previous records, thus making it necessary to consult only one file of cards for any information relating to the contents of the Library. The accession record is typewritten on sheets in accordance with the loose-leaf binding system, thus saving the time of copying titles by hand. The annuals have been transferred from the periodical record to the author catalogue, thus avoiding the making of two entries.

A new system of filing letters in numbered folders, with a card index, has been introduced, making easily accessible the correspondence which, in conjunction with the author and donor catalogue, forms a permanent record of the exchanges for the Smithsonian publications. The old files are gradually being rearranged and incorporated with the new system.

The lending of books in the reference room and periodical reading room has been placed in charge of one person, in connection with other duties.

The titles of purchased books are now entered on cards which are filed alphabetically. These card entries take the place of entries on sheets in book form, with card index.

With a thoroughly modern equipment in the way of furniture and fixtures greater improvements could be made than is possible at present.

Extension of space occupied by library.—Tentative plans have been prepared and submitted for fireproof bookstacks and bookcases for the large hall on the main floor of the Smithsonian Building to contain the libraries of the Government bureaus under the Smithsonian Institution. More definite plans are now in preparation.

International Congress of Archivists and Librarians and the International Congress of Bibliography and Documentation.—The Institution was represented by the assistant librarian, Mr. Paul Brockett, who presented a paper giving the views of the Smithsonian Institution in the matter of international exchange. At the same time he made observations on the methods and arrangement of European libraries. A separate report on this matter has been submitted by him.

ACCESSIONS.

For the Smithsonian deposit, Library of Congress, the accessions recorded numbered 3,136 volumes, 1,277 parts of volumes, 3,137 pamphlets, and 489 charts, making a total of 8,039 publications. The accession numbers run from 500,001 to 504,149.

The parts of serial publications entered on the card catalogue numbered 24,426, and 1,100 slips for completed volumes were made, and 100 cards for new periodicals and annuals.

These publications were forwarded to the Library of Congress immediately upon their receipt and entry. In their transmission 230 boxes were required, containing approximately the equivalent of 9,200 volumes. The actual number of pieces sent, including parts of periodicals, pamphlets, and volumes, was 26,286. This statement does not, however, include about 3,200 parts of serial publications secured in exchange to complete sets and transmitted separately.

Inaugural dissertations and academic publications were received from universities at the following places:

Basel.	Halle-an-der-Saale.	Paris.
Bonn.	Heidelberg.	Prague.
Berlin.	Kiel.	Rostock.
Breslau.	Leipzig.	St. Petersburg.
Cuzco.	Liege.	Tübingen.
Dorpat.	London.	Utrecht.
Freiburg i. B.	Lund.	Würzburg.
Giessen.	Marburg.	Zürich.
Graz.	New Haven.	
Greifswald.	Oviedo.	

Similar publications have been received from the technical high schools at Berlin, Braunschweig, Karlsruhe, and Munich.

The office library received 440 volumes and pamphlets, and 77 parts of volumes and charts, making a total of 517 publications. Thirteen volumes were purchased for the employees' library and one received by donation.

As already mentioned, an author catalogue, combining author and donor entries on cards of standard size was established this year and has taken the place of the previous "donor" record. Catalogue cards made for the author-donor catalogue numbered 3,199. In addition, a new finding list of 320 entries was made for the periodicals in the reading room, making a total of 3,519 cards. The recataloguing of scientific serials and annuals was commenced. The volumes recatalogued numbered 1,008.

The policy of sending foreign public documents presented to the Institution to the Library of Congress without stamping or entering has been continued, and the number of publications given above does not include these, nor does it include other publications for the Library of Congress received through the International Exchange Service.

The work of checking up and completing the Smithsonian deposit sets of publications of scientific societies and learned institutions of the world has been continued, and those of France have received special consideration.

DUPLICATES.

For a number of years about 10,000 duplicate Government documents returned by the Library of Congress, principally relating to statistics, were stored in the south tower of the Smithsonian Building. With the assistance of the International Exchanges during the previous year these publications were arranged and listed and later the larger part was turned over to the New York Public Library to complete its sets. Public documents of the United States were returned to the Superintendent of Documents.

EXCHANGES.

The establishing of new exchanges and the securing of missing parts to complete sets of publications in the Smithsonian Library required the writing of 2,800 letters, resulting in the addition of about 100 periodicals and in the receipt of about 3,200 missing parts.

The mail receipts numbered 32,647 packages, and 3,500 packages were received through the International Exchange Service. The publications contained therein were stamped and distributed for entry from the mail desk.

About 4,453 acknowledgments were made on the regular forms in addition to the letters which were written in acknowledgment of publications received in response to the requests of the Institution for exchange.

New exchanges of the annual reports of the American Historical Association from the allotment agreed upon for that purpose resulted in the acquisition of a number of publications of historical societies throughout the world, which were added to the Smithsonian deposit in the Library of Congress.

READING ROOM.

The periodical bins in the reading room were rearranged and, as already mentioned, a new finding list was made out on cards which were arranged alphabetically. Publications no longer consulted were transferred to the permanent sets, either in the Smithsonian deposit or in some one of the libraries of the Government branches of the Institution to which they belong. This gives the Institution and its branches a thoroughly useful periodical reading room.

As many of the publications kept in this room are not to be found in other American libraries, they are consulted not only by Washington investigators, but by some from other centers. During the year the scientific staff of the Institution and its branches made use of 131 bound volumes of periodicals, and 2,949 parts of scientific periodicals and popular magazines. In addition, the various bureaus of the Government continue to avail themselves of the opportunity to use these publications, as well as those in the sectional libraries of the branches of the institution, and the library is frequently visited by investigators from all parts of the world.

ART ROOM.

No additions were made to the art objects or engravings in this room during the past year. With the additional space available for the use of the Division of Graphic Arts in the National Museum, it is expected that some of the engravings will be exhibited there.

THE EMPLOYEES' LIBRARY.

The books added to this library by purchase numbered 13, and one publication was presented. By binding, 415 volumes of periodicals were made available for circulation. The total number of books borrowed was 1,876. A number of books selected especially for the purpose were sent to the National Zoological Park, as in previous years.

LIBRARIES OF THE SMITHSONIAN BRANCHES.

United States National Museum.—The congestion in the museum library reported last year has been relieved to a certain extent by the temporary employment of four cataloguers and the assignment of space on two of the

galleries in the old Museum building for sorting and arranging all the duplicate material. The duplicates were arranged, placed on temporary shelving, and roughly catalogued, and the question of disposing of such part of them as are not required in the general library or by the scientific staff will be taken up during the early part of the coming fiscal year.

Many important gifts were received during the year, and the following members of the staff have presented publications: Dr. Theodore N. Gill, Mr. J. H. Riley, Dr. C. W. Richmond, Mr. Robert Ridgway, Dr. W. H. Dall, Dr. Paul Bartsch, Mr. W. H. Holmes, Dr. Walter Hough, Dr. F. H. Knowlton, Mr. J. C. Crawford, and the late Mr. D. W. Coquillett.

The Museum library now contains 40,211 volumes, 66,674 unbound papers, and 110 manuscripts. The accessions during the year consisted of 1,911 books, 4,014 pamphlets, and 202 parts of volumes; 878 books, 1,033 complete volumes of periodicals, and 4,181 pamphlets were catalogued.

Attention has been given to the preparation of volumes for binding, with the result that 809 books were sent to the Government bindery.

The number of books, periodicals, and pamphlets borrowed from the general library amounted to 28,028, among which were 5,582 obtained from the Library of Congress and other libraries, and 4,142 assigned to the sectional libraries of the Museum.

One sectional library has been added to those already established, and the complete list now stands as follows:

Administration	Geology	Paleobotany
Administrative assistant's office	History	Parasites
Anthropology	Insects	Physical anthropology
Biology	Invertebrate paleontology	Prehistoric archeology
Birds	Mammals	Reptiles and batrachians
Botany	Marine invertebrates	Superintendent's office
Comparative anatomy	Materia medica	Taxidermy
Editor's office	Mesozoic fossils	Technology
Ethnology	Mineralogy	Vertebrate paleontology
Fishes	Mollusks	
	Oriental archeology	

The records of the Museum library consist of an authors' catalogue, an accession book, a periodical record on standard cards, and a lending record. This lending record is on cards and includes the books borrowed from the Library of Congress and other libraries for the use of the scientific staff. No changes were made either in the arrangement or in the methods of carrying on this work.

Letters requesting new exchanges and for the purpose of completing the sets already in the Museum library have been given every consideration, and a number of titles have been added in this way.

Owing to the crowded condition of the general library, it has been necessary to use the reading room as a place for receiving and distributing publications for the Museum library. The transfer and arranging of the duplicates on the galleries will relieve this condition to some extent and make it possible for that work to be done elsewhere.

Bureau of American Ethnology.—The report of this library will be made by the ethnologist in charge and incorporated in his general report.

Astrophysical Observatory.—A thorough overhauling of this library and the removal of duplicates and such other material as is not needed was undertaken during the year. As a result, the observatory now has for reference a very efficient working library relating to astrophysics and allied subjects. During

the year 93 volumes and 11 parts of volumes were added, making a total addition of 104 publications.

National Zoological Park.—A small reference library of zoological books is maintained at the park, to which 15 volumes were added during the year.

Summary of accessions.—The following statement summarizes all the accessions during the year, except for the Bureau of American Ethnology, which is separately administered:

Smithsonian deposit in Library of Congress, including parts to complete sets.....	11, 239
Smithsonian office, Astrophysical Observatory, National Zoological Park, and International Exchanges.....	676
United States National Museum Library.....	6, 127
Total.....	18, 042

Respectfully submitted.

F. W. TRUE,

Assistant Secretary in charge of Library and Exchanges.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX VII.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the year ending June 30, 1911, together with a report of the proceedings at the Second International Convention of the International Catalogue of Scientific Literature held in London July 12 and 13, 1910, outlining the general condition of the whole enterprise:

The appropriation made by Congress for the maintenance of the bureau during the year was \$7,500, an increase of \$1,500 over the appropriation for the previous year.

Five persons are regularly employed in the bureau, and the services of temporary clerical assistants occasionally engaged.

In order to properly analyze and classify the many scientific works now being published in the United States it is not only desirable but necessary to obtain the advice and assistance of scientific men who are specialists in the several sciences included in the scope of the catalogue, and the increase of \$1,500 in the appropriation for the catalogue this year has made it possible to have some of the more technical papers referred to such specialists.

It is a matter of gratification to report that the utmost interest has been shown by all the scientific men who have been approached for aid, and that for a nominal sum classification citations are prepared and furnished to the bureau, thus rendering it possible for the scientific publications of the United States to be not only indexed in a thorough bibliographical manner, but also, when necessary, classified by specialists. The classification numbers used in the subject-catalogue refer to the subject-contents of the papers cited, and furnish the equivalent of an abstract of each paper indexed.

During the year 26,020 cards were sent from this bureau, as follows:

Literature of—

1901.....	3
1902.....	26
1903.....	28
1904.....	218
1905.....	129
1906.....	374
1907.....	423
1908.....	1,301
1909.....	8,836
1910.....	14,682
Total.....	26,020

Thirty-two regional bureaus are now cooperating in the preparation and publication of the International Catalogue of Scientific Literature. The catalogue consists of 17 annual volumes published by a central bureau in London. The regional bureaus are maintained by the countries they represent, usually

by direct governmental grants; the central bureau is maintained by funds derived from subscriptions to the work. Supreme control of the enterprise is vested in a body known as an international convention which met in London in 1905 and again in July, 1910, thereafter to meet every 10 years. Each country maintaining a regional bureau has the right to send delegates to this convention. The assistant in charge of the regional bureau for the United States was appointed by the Secretary of the Smithsonian Institution to represent the United States at the second international convention. The principal countries of the world sent delegates to the convention as follows: Austria, Belgium, Denmark, France, Germany, Netherlands, India, Italy, Japan, New South Wales, Russia, South Australia, Sweden, the United Kingdom, and the United States.

At the opening meeting held in the rooms of the Royal Society on July 12, 1910, Sir Archibald Geikie, president of the Royal Society, was elected chairman, and Prof. Henry E. Armstrong, F. R. S., vice chairman. The report of the executive committee was then laid before the convention. This report stated that the seven annual issues of the catalogue already published, comprising 117 volumes, had cost the London central bureau to edit, print, and publish, \$257,980, for which \$246,410 had been received from the subscribers to the catalogue. Each annual issue of 17 volumes had averaged 9,117 pages. From estimates made it appeared that when the first 10 annual issues were published the receipts and expenditures of the central bureau would probably balance, and it was thought that taking into account the extent and difficulty of the enterprise this result would not be unsatisfactory.

While the gross annual income received from subscriptions has exceeded the estimate originally made by an average of over \$8,000, the cost of editing and printing has been much greater than was originally estimated. This is due mainly to the fact that the size of each issue of the catalogue has greatly exceeded the original estimate, and also, in a lesser degree, to the fact that an edition of 1,000 copies, instead of 500, was printed. The working capital needed was also larger than originally estimated, it being necessary for the Royal Society to advance to the central bureau \$37,500, on which interest is paid.

Although the International Catalogue is understood to be a permanent organization it is one of the duties of each convention to authorize the continuation of the publication for definite periods. The following motion, therefore, was made and it was resolved:

That in view of the success already achieved by the International Catalogue of Scientific Literature and the great importance of the objects promoted by it, it is imperative to continue the publication of the catalogue at least during the period 1911-1915, and, on recommendation of the international council, during the subsequent five years 1916-1920.

After several motions concerning details of organization, it was unanimously voted "that it is most desirable that a capital fund should be obtained for the catalogue." It is now apparent that a capital fund to be at the disposal of the central bureau has been urgently needed since the beginning of the undertaking. Lacking a capital fund, it has been necessary for the central bureau to borrow money on which interest has to be paid, and on account of lack of funds it has been impossible to carry out several plans looking to the general improvement of the work. Had a capital fund been available in the beginning of the enterprise, it would not have been necessary for the subscription price to be placed at such a high figure. Consequently, a larger edition could have been disposed of and at a lower rate to each subscriber. At the session of the convention on July 13, methods of administration were discussed and the following resolution passed:

That each regional bureau be requested to prepare a list of journals in each science which the catalogue will completely index in the annual issue following the year of publication, and that the central bureau be authorized to publish the lists thus prepared.

The new List of Journals will consist of titles of publications devoted almost exclusively to scientific matters, and these journals will be given precedence in the work of the regional bureaus. though references to scientific papers published in other than regular scientific journals will eventually find a place in the catalogue. Some such action was necessary on account of the impossibility of dealing promptly with the vast number of semiscientific journals now published throughout the world, and, as promptness of publication is one of the most desirable features in an index-catalogue, it was necessary to find some means whereby an index to the more important papers could be prepared practically as soon as the papers themselves were published.

To render it possible to promptly publish future volumes of the catalogue the following resolution was adopted:

That the resolution of the year 1900 authorizing the central bureau to close these volumes at different stated dates, each volume to correspond to the literature of a period of 12 months, be confirmed.

The effect of this resolution will be that the separate volumes of the catalogue will not necessarily cover the whole calendar year but will cover a period of 12 months. A number of discussions then followed, pertaining to plans for improvements in the organization and general work of the regional bureaus. It was then resolved:

That in view of the resolution adopted unanimously by the representatives of the various countries constituting the convention, desiring the Royal Society to continue its responsibility for the publication of the International Catalogue for a further period, the committee appointed be instructed: (1) To take all possible steps to prevent reduplication by the publication of several annual and similar catalogues and indexes on the same subject, by making arrangements such as those now in force with the Zoological Society of London. (2) To obtain further assistance and cooperation in the preparation of the material of the catalogue from the principal scientific societies and academies and the organizations which collect materials for indexing scientific literature.

The idea now seems to prevail that the organization of the International Catalogue of Scientific Literature will gradually be able to cooperate with the present editors and publishers of the various scientific indexes and yearbooks, so that the annual volumes of the International Catalogue will eventually entirely supersede and take the place of all similar publications. This will not only be of common benefit to the International Catalogue and to the societies and private individuals now doing such work, but will greatly assist scientific investigators and librarians in whose interest the International Catalogue is prepared.

The question of publishing a decennial index was then discussed and it was decided that on account of the great expense necessarily involved the work could not for the present be undertaken. The matter was left for the action of the next international council, which will be held within the next two years.

During the meeting of the convention the foreign delegates were the recipients of numerous and gracious hospitalities from the Royal Society, the Royal Society Club, and individually from the English members of the convention.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.
18308°—SM 1911—6

APPENDIX VIII.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1911:

The total number of copies of publications of the Smithsonian Institution and its branches distributed during the year was 197,206. This aggregate included 643 volumes and separates of Smithsonian Contributions to Knowledge, 35,935 of Smithsonian Miscellaneous Collections, 19,622 special publications, including 2,743 volumes on the Harriman Alaska expedition; 518 publications not included in the Smithsonian series; 22,482 annual reports and bulletins of the Bureau of American Ethnology, and 110,000 copies of the various publications of the National Museum.

I. SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

The Langley Memoir on Mechanical Flight which was begun by the late Secretary Langley in 1904, and continued by Mr. Charles M. Manly, assistant in charge of experiments, was in type and nearly ready for distribution at the close of the year. This work forms a part of volume 27 of the Contributions to Knowledge.

II. SMITHSONIAN MISCELLANEOUS COLLECTIONS.

In the series of Smithsonian Miscellaneous Collections were published (1) cover and preliminary pages for volume 51; (2) two papers of volume 53, with cover, preliminary pages, and index, completing that volume; (3) thirteen papers of volume 56; (4) four papers of volume 57; (5) and the Smithsonian Physical Tables, by F. E. Fowle, forming part of volume 58.

The issues of the Smithsonian Miscellaneous Collections during the year were as follows:

1928. Smithsonian Miscellaneous Collections. Cover and preliminary pages for volume 54. Octavo. Pages v.

1934. Cambrian Geology and Paleontology. No. 6: *Olenellus* and other Genera of the Mesonacidae. By Charles D. Walcott. Published August 12, 1910. Octavo. Pages 231-422 (unpagged index), with Plates 23-44. Volume 53, No. 6.

1939. Cambrian Geology and Paleontology. No. 7: *Pre-Cambrian Rocks of the Bow River Valley, Alberta, Canada.* By Charles D. Walcott. Published August, 1910. Octavo. Pages 423-431, with Plates 45-47. Volume 53. No. 7.

1940. Cambrian Geology and Paleontology. II. *Abrupt Appearance of the Cambrian Fauna on the North American Continent.* By Charles D. Walcott. Published August 18, 1910. Octavo. Pages 1-16. Volume 57, No. 1.

1941. Notes on a Horn-feeding Lepidopterous Larva from Africa. By August Busck. Published July, 1910. Octavo. Pages 2, with 2 plates. Volume 56, No. 8.
1942. Description of Seven New Species of East African Mammals. By Edmund Heller. Published July 22, 1910. Octavo. Pages 5, with three plates. Volume 56, No. 9.
1943. Smithsonian Miscellaneous Collections. Cover and preliminary pages for volume 51. Octavo.
1944. Smithsonian Physical Tables. Fifth Revised Edition. By F. E. Fowle, aid, Smithsonian Astrophysical Observatory. Published May 17, 1911. Octavo. Pages xxxiv, 318. Volume 58, No. 1.
1945. New Landshells from the Smithsonian African Expedition. By William Healey Dall. Published July 22, 1910. Octavo. Pages 3. Volume 56, No. 10.
1946. Development of the Digestive Canal of the American Alligator. By Albert M. Reese, Professor of Zoology, West Virginia University. Published October 29, 1910. Octavo. Pages 25, with 15 plates. Volume 56, No. 11.
1947. The Flying Apparatus of the Blow-Fly. By Dr. Wolfgang Ritter. Hodgkins Fund. Published May 11, 1911. Octavo. Pages 76, with 20 plates. Volume 56, No. 12.
1949. Cambrian Geology and Paleontology. By Charles D. Walcott. Cover, preliminary pages, and index for papers 1 to 7. Published June 1, 1911. Octavo. Pages ix, 433-498. Volume 53.
1988. Two New African Ratels. By N. Hollister. Published October 10, 1910. Octavo. Pages 3. Volume 56, No. 13.
2003. Descriptions of Ten New African Birds. By Edgar A. Mearns. Published December 23, 1910. Octavo. Pages 7. Volume 56, No. 14.
2004. New Species of Insectivores from British East Africa, Uganda, and the Sudan. By Edmund Heller. Published December 23, 1910. Octavo. Pages 8, with one plate. Volume 56, No. 15.
2005. Some Results of Recent Anthropological Exploration in Peru. By Aleš Hrdlička. Published April 26, 1911. Octavo. Pages 16, with four plates. Volume 56, No. 16.
2006. New Species of Rodents and Carnivores from Equatorial Africa. Published February 28, 1911. Octavo. Pages 16. Volume 56, No. 17.
2007. Bibliography of the Scientific Writings of R. E. C. Stearns. By Miss Mary R. Stearns. With Biographical Sketch by William H. Dall. Published April 12, 1911. Octavo. Pages 15, with one plate. Volume 56, No. 18.
2008. The Silver Disk Pyrheliometer. By. C. G. Abbot. Published March 31, 1911. Octavo. Pages 10, with one plate. Volume 56, No. 19.
2009. Cambrian Geology and Paleontology. II. No. 2. Middle Cambrian Merostomata. By Charles D. Walcott. Published April 8, 1911. Octavo. Pages 17-40, with six plates. Volume 57, No. 2.
2010. Descriptions of Fifteen New African Birds. By Edgar A. Mearns. Published April 17, 1911. Octavo. Pages 11. Volume 56, No. 20.
2011. Cambrian Geology and Paleontology. II. No. 3: Middle Cambrian Holothurians and Medusæ. By Charles D. Walcott. Published June 13, 1911. Octavo. Pages 41-68, with Plates 8-13. Volume 57, No. 3.
2012. Cambrian Geology and Paleontology. II. No. 4: Cambrian Faunas of China. By Charles D. Walcott. Published June 17, 1911. Octavo. Pages 69-108, with Plates 14-17. Volume 57, No. 4.

The following papers of Smithsonian Miscellaneous Collections were in press at the close of the year:

2014. Cambrian Geology and Paleontology. II. No. 5: Middle Cambrian Annelids. By Charles D. Walcott. Pages 109-144, with Plates 18-23. Volume 57, No. 5.
2015. Description of a New Genus and Species of Hummingbird from Panama. By E. W. Nelson. Volume 56, No. 21.

III. SMITHSONIAN ANNUAL REPORTS.

The annual report for 1909 was published in January, 1911.

1986. Annual Report of the Board of Regents of the Smithsonian Institution, showing Operations, Expenditures, and Conditions of the Institution for the year ending June 30, 1909. Octavo. Pages x, 751, with 73 plates and 4 maps. Containing publications 1915, 1916, and 1950-1985.

Small editions of the following papers, forming the general appendix of the Annual Report of the Board of Regents for 1909, were issued in pamphlet form:

1950. The Future of Mathematics. By Henri Poincaré. Pages 123-140.
1951. What Constitutes Superiority in an Airship. By Paul Renard. Pages 141-156.
1952. Researches in Radiotelegraphy. By J. A. Fleming. Pages 157-183, with two plates.
1953. Recent Progress in Physics. By Sir J. J. Thomson. Pages 185-205.
1954. Production of Low Temperatures, and Refrigeration. By L. Marchis. Pages 207-224.
1955. The Nitrogen Question from the Military Standpoint. By Charles E. Munroe. Pages 225-236.
1956. Simon Newcomb. By Ormond Stone. Pages 237-242, with one plate.
1957. Solar-radiation Researches, by Jules César Janssen. By H. de le Baume Pluvinel. Pages 243-251, with one plate.
1958. The Return of Halley's Comet. By W. W. Campbell. Pages 253-259, with four plates.
1959. The Upper Air. By E. Gold and W. A. Harwood. Pages 261-269.
1960. The Formation, Growth, and Habit of Crystals. By Paul Gaubert. Pages 271-278.
1961. The Distribution of Elements in Igneous Rocks. By Henry S. Washington. Pages 279-304.
1962. The Mechanism of Volcanic Action. By H. J. Jonston-Lavis. Pages 305-315, with 3 plates.
1963. Conservation of Natural Resources. By James Douglas. Pages 317-329.
1964. The Antarctic Land of Victoria. By Maurice Zimmermann. Pages 331-353.
1965. Some Results of the British Antarctic Expedition, 1907-9. By E. H. Shackleton. Pages 355-368, with 6 plates and 3 maps.
1966. The Oceanography of the Sea of Greenland. By D. Damas. Pages 369-383, with 2 plates.
1967. From the Niger, by Lake Chad, to the Nile. By Lieut. Boyd Alexander. Pages 385-400, with 3 plates.
1968. Mesopotamia: Past, Present, and Future. By Sir William Willcocks. Pages 401-416, with 4 plates and 1 map.
1969. Albert Gaudry and the Evolution of the Animal Kingdom. By Ph. Glangeaud. Pages 417-429.
1970. Charles Darwin. By August Weismann. Pages 431-452.

1971. *Present Problems in Plant Ecology: Problems of Local Distribution in Arid Regions.* By Volney M. Spalding. Pages 453-463.
1972. *The Instinct of Self-concealment and the Choice of Colors in the Crustacea.* By Romuald Minkiewicz. Pages 465-485.
1973. *The Origin and Development of the Parasitical Habits in the Cuculidæ.* By C. L. Barrett. Pages 487-492, with 2 plates.
1974. *Some Remarks on the Protective Resemblance of South African Birds.* By Alwin Haagner. Pages 493-504, with 2 plates.
1975. *An inquiry into the History of the Current English Names of North American Land Birds.* By Spencer Trotter. Pages 505-519.
1976. *Condition of Wild Life in Alaska.* By Madison Grant. Pages 521-529, with 1 plate.
1977. *Recent Discoveries Bearing on the Antiquity of Man in Europe.* By George Grant MacCurdy. Pages 531-583, with 18 plates.
1978. *European Population of the United States.* By W. Z. Ripley. Pages 585-606.
1979. *The Republic of Panama and its People.* By Eleanor Yorke Bell. Pages 607-637, with 14 plates.
1980. *Ceramic Decoration: Its Evolution and Applications.* By Louis Franchet. Pages 639-650.
1981. *Some Notes on Roman Architecture.* By F. T. Baggallay. Pages 651-667, with 4 plates.
1982. *The Relation of Science to Human Life.* By Adam Sedgwick. Pages 669-682.
1983. *Intellectual Work among the Blind.* By Pierre Villey. Pages 683-702.
1984. *The Relation of Mosquitoes, Flies, Ticks, Fleas, and other Arthropods to Pathology.* By G. Marotel. Pages 703-722.
1985. *Natural Resistance to Infectious Disease and its Reinforcement.* By Simon Flexner. Pages 723-738.

The report of the executive committee and Proceedings of the Board of Regents of the Institution, as well as the report of the Secretary, for the fiscal year ending June 30, 1910, both forming part of the annual report of the Board of Regents to Congress, were published in pamphlet form in December, 1910, as follows:

2001. *Report of the Executive Committee and Proceedings of the Board of Regents for the year ending June 30, 1910.* Pages 21, with 1 plate.
2002. *Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1910.* Pages 89.

The general appendix to the Smithsonian Report for 1910 was in type, but actual presswork could not be completed before the close of the fiscal year. In the general appendix are the following papers:

- Melville Weston Fuller, 1833-1910, by Charles D. Walcott.
- Ornamentation of Rugs and Carpets, by Alan S. Cole.
- Recent Progress in Aviation, by Octave Chanute.
- Progress in Reclamation of Arid Lands in the Western United States, by F. H. Newell.
- Electric Power from the Mississippi River, by Chester M. Clark.
- Safety Provisions in the United States Steel Corporation, by David S. Beyer.
- The isolation of an Ion, a Precision Measurement of its Charge, and the Correction of Stokes's Law, by R. A. Millikan.
- The Telegraphy of Photographs, Wireless and by Wire, by T. Thorne Baker.
- Modern Ideas on the Constitution of Matter, by Jean Becquerel.
- Some Modern Developments in Methods of Testing Explosives, by Charles E. Munroe.

Sir William Huggins, by W. W. Campbell.

The Solar Constant of Radiation, by C. G. Abbot.

Astronomical Problems of the Southern Hemisphere, by Heber D. Curtis.

The Progressive Disclosure of the Entire Atmosphere of the Sun, by Dr. H. Deslandres.

Recent Progress in Astrophysics in the United States, by J. Bosler.

The Future Habitability of the Earth, by Thomas Chrowder Chamberlin.

What Is Terra Firma? A review of current research in isostasy, by Bailey Willis.

Transpiration and the Ascent of Sap, by Henry H. Dixon.

The Sacred Ear-Flower of the Aztecs, by William Edwin Safford.

Forest Preservation, by Henry S. Graves.

Alexander Agassiz, 1835-1910, by Alfred Goldsborough Mayer.

Recent Work on the Determination of Sex, by Leonard Doncaster.

The Significance of the Pulse Rate in Vertebrate Animals, by Florence Buchanan.

The Natural History of the Solitary Wasps of the Genus *Synagris*, by E. Roubaud.

A Contribution to the Ecology of the Adult Hoatzin, by C. William Beebe.

Migration of the Pacific Plover to and from the Hawaiian Islands, by Henry W. Henshaw.

The Plumages of the Ostrich, by Prof. J. E. Duerden.

Manifested Life of Tissues Outside of the Organism, by Alexis Carrel and Montrose T. Burrows.

The Origin of Druidism, by Julius Pokorny.

Geographical and Statistical View of the Contemporary Slav Peoples, by Lubor Niederle.

The Cave Dwellings of the Old and New Worlds, by J. Walter Fewkes.

The Origin of West African Crossbows, by Henry Balfour.

Sanitation on Farms, by Allen W. Freeman.

Epidemiology of Tuberculosis, by Robert Koch.

IV. SPECIAL PUBLICATIONS.

The following special publications were issued during the year:

1871. A Reprint of Smithsonian Mathematical Tables: Hyperbolic Functions. By George F. Becker and C. E. Van Orstrand. Published June, 1911. Octavo. Pages li, 321.

1932. Classified list of Publications available for distribution May, 1910. Octavo. Pages 37. July, 1910.

1938. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 1 to 35. Octavo. Pages 62. July, 1910.

1989. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 26 to 29. Octavo. Pages 63-68. October, 1910.

The following special publication was in type but had not been issued at the close of the year.

2013. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 30-37.

HARRIMAN ALASKA SERIES.

The Institution received from Mrs. Edward H. Harriman several thousand copies of volumes descriptive of the Harriman expedition to Alaska in 1899. Special Smithsonian title pages were added to the volumes before distribution by the Institution. The subjects were as follows:

1990. Volume I: Narrative, Glaciers, Natives. By John Burroughs, John Muir, and George Bird Grinnell. Pages 184, with 60 plates and 4 maps.

1991. Volume II: History, Geography, Resources. By William H. Dall, Charles Keeler, B. E. Fernow, Henry Gannett, William H. Brewer, C. Hart Merriam, George Bird Grinnell, and M. L. Washburn. Pages 200, with 64 plates and 1 map.
1992. Volume III: Glaciers and Glaciation. By Grove Karl Gilbert. Pages 231, with 17 plates and 1 map.
1993. Volume IV: Geology and Paleontology. By B. K. Emerson, Charles Palache, William H. Dall, E. O. Ulrich, and F. H. Knowlton. Pages 173, with 33 plates and 1 map.
1994. Volume V: Cryptogamic Botany. By J. Cardot, Clara E. Cummings, Alexander W. Evans, C. H. Peck, P. A. Saccardo, De Alton Saunders, I. Theriot, and William Trelease. Pages 424, with 44 plates.
1995. Volume VIII¹: Insects. Part I. By William H. Ashmead, Nathan Banks, A. W. Caudell, O. F. Cook, Rolla P. Currie, Harrian G. Dyar, Justus Watson Folsom, O. Heidemann, Trevor Kincaid, Theo. Pergande, and E. A. Schwarz. Pages 238, with 17 plates.
1996. Volume IX: Insects. Part II. By William H. Ashmead, D. W. Coquillett, Trevor Kincaid, and Theo. Pergande. Pages 284, with 4 plates.
1997. Volume X: Crustaceans. By Mary J. Rathbun, Harriet Richardson, S. J. Holmes, and Leon J. Cole. Pages 337, with 26 plates.
1998. Volume XI: Nemerteans. By Wesley R. Coe. Bryozoans. By Alice Robertson. Pages 251, with 25 plates.
1999. Volume XII: Enchytræids. By Gustav Eisen. Tubicolous Annelids. By Katherine J. Bush. Pages 355, with 44 plates.
2000. Volume XIII: Land and Freshwater Mollusks. By William H. Dall. Hydroids. By C. C. Nutting. Pages 250, with 15 plates.

V. PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (a) The annual report to Congress; (b) the Proceedings of the United States National Museum; and (c) the Bulletin of the United States National Museum, which includes the Contributions from the United States National Herbarium. The editorship of these publications is in charge of Dr. Marcus Benjamin.

The publications issued during the year comprised the annual report for 1910; papers 1750 to 1771 of volume 38, proceedings; papers 1772 to 1845 of volumes 39 and 40, proceedings; papers 1846, 1847, 1849-1852, 1854, and 1855 of volume 41, proceedings; five bulletins and seven parts of volumes of Contributions from the National Herbarium.

The bulletins were as follows:

- No. 71. A Monograph of the Foraminifera of the North Pacific Ocean. Part II, Textulariidae. By Joseph Augustine Cushman.
- No. 73. An account of the Beaked Whales of the Family Ziphiidae in the Collection of the United States National Museum, with Remarks on some Specimens in other American Museums. By Frederick W. True.
- No. 74. On some West Indian Echinoids. By Theodor Mortensen.
- No. 75. North Pacific Ophiurans in the Collection of the United States National Museum. By Hubert Lyman Clark.
- No. 76. Asteroidea of the North Pacific and Adjacent Waters. By Walter Kendrick Fisher.

In the series of Contributions from the National Herbarium there appeared: Volume 15. The North American Species of *Panicum*. By A. S. Hitchcock and Agnes Chase.

¹ Volumes VI and VII have not yet been prepared for publication.

- Volume 14, Part 2. History of the Coconut Palm in America. By O. F. Cook.
- Volume 13, Part 6. The Type Localities of Plants First Described from New Mexico. A Bibliography of New Mexican Botany. By Paul C. Standley.
- Volume 13, Part 7. A Preliminary Treatment of the Genus *Castilla*. By Henry Pittier.
- Volume 13, Part 8. The Genus *Talinum* in Mexico, by J. N. Rose and Paul C. Standley; and Two new Species of *Harperella*, by J. N. Rose.
- Volume 13, Part 9. Studies of Mexican and Central American Plants. No. 7. By J. N. Rose.
- Volume 13, Part 10. Miscellaneous Papers. By Albert W. C. T. Herre, William H. Brown, Joseph H. Painter, Paul C. Standley, Edward S. Steele, and E. A. Goldman.

VI. PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are discussed in detail in another appendix of the Secretary's report. The editorial work is in charge of Mr. J. G. Gurley.

The following eight bulletins were published by the bureau during the year:

- Bulletin 30. Handbook of American Indians North of Mexico. Edited by Frederick Webb Hodge. Part 2. Published 1911. Octavo. Pages iv, 1221, with many figures.
- Bulletin 37. Antiquities of Central and Southeastern Missouri. By Gerard Fowke. (Report on explorations made in 1906-1907 under the auspices of the Archaeological Institute of America.) Published 1910. Octavo. Pages vii, 116, with 19 plates and 20 figures.
- Bulletin 40. Handbook of American Indian Languages. By Franz Boas. Part 1. With illustrative sketches by Roland B. Dixon (Maidu), P. E. Goddard (Athapaskan: Hupa), William Jones, revised by Truman Michelson (Algonquian), John R. Swanton (Tlingit, Haida), William Thalbitzer (Eskimo); (Franz Boas: Introduction, Chinook, Kwakiutl, Tsimshian; John R. Swanton and Franz Boas, Siouan). Published 1911. Octavo. Pages vii, 1069.
- Bulletin 43. Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico. By John R. Swanton. Published 1911. Octavo. Pages vii, 387, with 32 plates (including 1 map) and 2 figures.
- Bulletin 44. Indian Languages of Mexico and Central America, and their Geographical Distribution. By Cyrus Thomas, assisted by John R. Swanton. Accompanied with a linguistic map. Published 1911. Octavo. Pages vii, 108, and 1 map.
- Bulletin 45. Chippewa Music. By Frances Densmore. Published 1910. Octavo. Pages xix, 216, with 12 plates, 8 figures, and many musical pieces.
- Bulletin 50. Preliminary Report on a Visit to the Navaho National Monument, Arizona. By Jesse Walter Fewkes. Published 1911. Octavo. Pages vii, 35, with 22 plates and 3 figures.
- Bulletin 51. Antiquities of the Mesa Verde National Park: Cliff Palace. By Jesse Walter Fewkes. Published 1911. Octavo. Pages 82, with 35 plates and 4 figures.

VII. PUBLICATIONS OF THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY.

There were no new publications issued by the Astrophysical Observatory during the year.

VIII. AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution and are

communicated to Congress under the provisions of the act of incorporation of the association.

Volume I of the report for the year 1908, sent to the printer in June, 1909, was published in July, 1910. Its contents were as follows:

Report of the Proceedings of the Twenty-fourth Annual Meeting of the American Historical Association. By Waldo G. Leland, secretary.

Report of the Proceedings of the Fifth Annual Meeting of the Pacific Coast Branch. By Jacob N. Bowman, secretary of the branch.

Report of Conference on Relations of Geography to History. By Erle Sparks. Proceedings of Conference on History in Secondary Schools. Edited by Andrew C. McLaughlin.

Report of Conference on Research in English History. By Edward P. Cheyney. Report of Conference on Research in American Colonial and Revolutionary History. By Herbert L. Osgood.

Report of Conference on Research in Southern History. By Lyon G. Tyler.

Report on Fifth Annual Conference on the Problems of State and Local Historical Societies. By St. George L. Sioussat.

The Viceroy of New Spain in the Eighteenth Century. By Don E. Smith.

Notes Supplementary to any Edition of Lewis and Clark. By Frederick J. Teggart.

The Historical Value of the Census Records. By Joseph A. Hill.

The American Newspapers of the Eighteenth Century as Sources of History. By William Nelson.

The Wilderness Campaign:

1. Grant's Conduct of the Wilderness Campaign. By Gen. Edward P. Alexander, Confederate States Army.

2. Lee's Conduct of the Wilderness Campaign. By Col. William R. Livermore, United States Army.

3. The Wilderness Campaign from Our Present Point of View. By Maj. Eben Swift, United States Army.

Ninth Annual Report of the Public Archives Commission. By Herman V. Ames, chairman.

Appendix A. Report on the Archives of the State of Maine. By Allen Johnson.

Appendix B. Report on the Archives of the State of Missouri. By Jonas Viles.

Appendix C. Report on the Archives of the State of Washington. By Jacob N. Bowman.

Appendix D. List of the Journals of the Councils and Assemblies and the Acts of the 13 Original Colonies in America Preserved in the Public Record Office, London. Edited by Charles M. Andrews.

Volume II of the 1908 report, sent to the printer April 26, 1910, had not been entirely completed June 30, 1911. It will be made up, for convenience, in two parts, pages 1-807, 808-1617, containing Parts II and III of Texas Diplomatic Correspondence. Edited by Prof. George P. Garrison.

The manuscript of the 1909 report, to form one volume, was sent to the printer January 10, 1911, and was practically all in type before June 30, 1911.

The manuscript of the 1910 report was sent to the printer June 3, 1911.

IX. SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Thirteenth Annual Report of the National Society of the Daughters of the American Revolution, for the year ending October 11,

1910, was received from the society February 24, 1911, and was communicated to Congress on February 27, in accordance with the act of incorporation of that organization.

X. SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee have been referred the manuscripts proposed for publication by the various branches of the Institution as well as those offered for printing in the Smithsonian Miscellaneous Collections. The committee also considered forms of routine blanks and various matters pertaining to printing and publication, including the qualities of paper suitable for text and plates. Twenty-four meetings were held and 115 manuscripts were acted upon.

Respectfully submitted.

A. HOWARD CLARK, *Editor.*

DR. CHARLES W. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX IX.

REPORT ON CONGRESS OF ARCHIVISTS AND LIBRARIANS, AND CONGRESS OF BIBLIOGRAPHY AND DOCUMENTATION.

SIR: I have the honor to present the following report as the representative of the Smithsonian Institution at the International Congress of Archivists and Librarians and the International Congress of Bibliography and Documentation, held at Brussels, Belgium, in August, 1910.

The Congress of Bibliography and Documentation, the first of the two congresses at Brussels, held its meetings from Thursday, August 25, through Saturday, August 27. On the printed list of members there were enrolled 24 associations, bureaus, and other organizations; 34 individual libraries and other institutions; and 160 persons by name, including duplications on lists. Forty-six countries were scheduled as in relation with the congress or with the Institut International de Bibliographie, under whose auspices this congress was held, and there were actually present representatives from at least 16 countries, including, besides the United States, Great Britain, France, Belgium, the Netherlands, Germany, Austria, Russia, Sweden, Switzerland, Spain, Bulgaria, Denmark, Norway, Monaco, and Turkey, about a hundred persons being actually present at most of the meetings.

This congress was officially opened by M. Paul Otlet, one of the secretaries. He spoke of the work of the Institut International de Bibliographie in collecting catalogue cards for every known scientific publication and their arrangement according to the Dewey decimal classification system; also an author's catalogue arranged alphabetically; a collection of picture postal cards of institutions and public buildings from all parts of the world, as well as of prominent persons, and a collection of photographic negatives covering all subjects, from which prints could be made, for persons pursuing a certain line of study. He explained that by documentation was meant the collection and preserving for reference of a series of newspaper and magazine clippings with their illustrations. He referred to the International Exchange Service and mentioned in glowing terms the work of the Smithsonian Institution in organizing and conducting the service in the United States. The congress then proceeded to consider the following subjects:

I. Documents:

1. Books, reviews, journals;
2. Illustrations, foreign photographs;
3. Archives, ancient and administrative.

II. Works and collections:

1. Editing;
2. Library cataloguing.
3. Collections;
4. Encyclopedic arrangement.

III. Methods:

1. Cards;
2. Rules and classification.

IV. Service, loan copies and exchanges:

1. Partial, general, and special;
2. National;
3. International, special;
4. International, scientific.

The subject of "International Exchanges" was briefly reviewed, and the following resolution was passed:

It is desirable to promote further developments of international exchange service, especially in obtaining frequent dispatch, in increasing the number of countries taking part in the international convention, and in providing for gratuitous transmission of all correspondence relative to request for exchanges, to the receipts for publications and to their return. It is especially desirable to admit free or beneficial associations and institutions to such exchange.

It is desirable that the Smithsonian Institution, the initiator of the service of international exchanges, should itself promote the revision of the international convention of 1885 for the purpose of realizing these improvements.

The congress officially visited the Congo Museum at Tervueren and closed with a banquet on the evening of August 27.

The Congress of Archivists and Librarians, second to assemble, but first in point of numbers and scope, met at Brussels from Sunday, August 28, through Wednesday, August 31, under the auspices of the Association of the Belgian Archivists and Librarians, M. Louis Stalnier, administrator-inspector of the Royal Library of Belgium, being the official in charge of the preliminary preparations. The printed list showed 18 countries represented by national commissions (with especial reference to archives), 12 countries represented by official delegates, delegations from 9 Belgian learned societies, 49 libraries and other institutions entered on the registry and 389 individual names, these last, of course, representing the personnel of the representative delegations as well as individual members. These 389 enrolled participants represented 21 different countries, including, besides the United States, England, Canada, Germany, France, Belgium, Holland, Austria, Hungary, Spain, Switzerland, Portugal, Russia, Italy, Brazil, Cuba, Denmark, Sweden Norway, Luxemburg, and Monaco.

This congress was convened on the afternoon of the 28th of August with addresses of welcome, and immediately divided into two sections, the archivists and the librarians, which held separate meetings. My time was largely devoted to the library section, and the discussions relating particularly to library methods included cataloguing, classification, and the placing of books upon the shelves. My paper on the International Exchange Service, having been printed in advance and distributed, was read by title. This paper is as follows:

There is no more important subject to be discussed at the Congrès International des Archivistes et des Bibliothécaires than that of the international exchanges, as the value of that service to libraries can not be overestimated. The time has come when the scientific and learned institutions, the public, the research workers, and the students of literature demand the scientific and literary publications of the world.

Considering the question "Dans quel sens a-t-il lieu de réorganiser et d'étendre le service des échanges internationaux" from an American point of view, it does not appear that reorganization is what is needed, for a system of international exchanges working with the hearty cooperation of all nations has not yet ever been developed on the lines of the existing conventions.

The present international exchange service is operating under two conventions made between certain powers, and the work is based upon them. One of these, signed at Brussels in 1886 and officially proclaimed in 1889, made provision for the exchange of official documents and scientific and literary publications. The other, which was concluded and proclaimed at the same time, provided for the immediate exchange of the official journal, as well as of the parliamentary annals and documents of the contracting parties. The

conventions were broadly worded and allowed for the adherence of other states than those that became signatories at the time. The signers were the plenipotentiaries of the United States of America, Belgium, Brazil, Italy, Portugal and the Algarves, Servia, Spain, and the Swiss Confederation. Later the Argentine Republic, Paraguay, and Uruguay signified their adherence, while Bolivia, Chile, Colombia, Costa Rica, France, Liberia, the Netherlands, New South Wales, Peru, Queensland, and Russia have established international exchange bureaus without, however, giving their formal adherence to the conventions. From this it will be seen that there are eleven states that have adhered to the conventions and an equal number that have established bureaus without adherence, while Great Britain, Germany, and the other countries contribute no funds toward the organization of this movement.

It is therefore obvious that under the existing conditions it is not reorganization but organization that is needed, and this may readily be accomplished under the conventions now in force, as they form a firm foundation for a great international institution. The provisions in these conventions made twenty years ago may need revision in order to conform to recent international advancement, and it is possible that the powers that have already agreed to the conventions and lent their support might be willing to reopen them, provided that the powers that have not come in are willing to join in the organization of an international exchange service.

The international exchanges as now carried on are of two classes—scientific and literary publications and official Government publications. The first named of these is of the utmost importance to the cause of education, both scholastic and technical, which the present service has materially advanced by enabling individuals and institutions of learning to disseminate knowledge without restriction and practically without cost to themselves. The scientific institutions are appreciating more and more the fact that their endowments are entirely inadequate to provide for the many calls made upon them, and if in addition to printing their own publications they should have to purchase those of foreign institutions and pay the cost of transportation it would mean that some part of their work would have to be abandoned. It is therefore to a system of international exchanges that they must look for relief in this matter.

The Government exchanges are necessary in order that Governments may ascertain what is being accomplished along similar lines in other countries, and as such publications are issued at the expense of the Governments they should also be distributed at their expense.

The International Exchange Service of the United States is under the direction of the Smithsonian Institution, and was originally inaugurated for the purpose of transmitting publications presented by institutions and individuals in the United States to correspondents abroad, in exchange for like contributions from such recipients, as one of the most efficient means for the "diffusion of knowledge among men," and the entire expense, including that for the exchange of documents published by the Government from 1850 to 1881, was paid from the private funds of the Institution.

Through the action of Congress, upon recommendation of the Department of State, the Smithsonian Institution is recognized by the United States Government as the American agency for the international exchange of governmental, scientific, and literary publications. By the congressional resolutions passed in 1867 and 1901 a certain number of United States Government publications are set aside for exchange with those of foreign countries, to be sent regularly to designated depositories. In accordance with those resolutions there are now forwarded abroad 55 full sets of United States official publications and 33 partial sets; the official journal of the proceedings of Congress, the Congressional Record, is transmitted by mail daily to each of the Parliaments that is willing to reciprocate.

During the fiscal year ending June 30, 1909, the number of packages forwarded through the international exchanges of the United States amounted to 228,875. These packages were sent direct from this country to the one for which they were intended, and from long experience this has been found to be the quickest and most satisfactory method. During the last year nearly 2,000 boxes were shipped in this way without the loss of a single consignment. Shipments are made regularly at least once a month, should the sending be but one package, and to the larger countries every week.

A card index is kept of all correspondents, and upon these cards are recorded the packages sent and received by each institution and individual.

There are now in the United States 3,900 institutions and 8,000 individuals recorded in this index, while the foreign institutions number 16,500 and individuals 34,232. A list of the foreign societies and institutions is published from time to time under the title of "International exchange list," the latest issue being that of 1904.

The public documents received from abroad in exchange are placed in the Library of Congress. The publications received from the scientific and learned societies and institutions of the world form an important part of the Library of the Smithsonian Institution, and while these remain the property of the Institution they are in great part deposited in the Library of Congress.

The needs of the international exchanges under present conditions may be summarized as follows: The adherence of all the civilized nations of the world to the present conventions. The members of the Congress of Archivists and Librarians can do much to further the movement by lending their efforts to arouse the interest of the scientific and literary institutions and societies and governmental authorities in their respective countries, to the end that official action may be taken. The scientific institutions and societies of each country should examine the workings of the international exchange system and solicit exchange of publications from like societies abroad, using the service as a medium of transmission.

Governments should provide a sufficient number of sets of their official publications for exchange purposes in order that each country may have a full set if desired, and in addition there should be copies of the official journals of the Parliaments, or similar bodies, for the interparliamentary exchanges.

Bureaus already established, as well as those to be established, should be granted an appropriation that will allow the carrying out in full of the stipulations of the conventions. A well-paid and energetic staff with a well-equipped office would insure expeditious work and prompt delivery. The present facilities for rapid transportation would be greatly increased by each international exchange office having the franking privilege, such as is allowed in the United States, and the granting of special concessions by the postal authorities, through the International Postal Union, which could possibly be arranged should every nation become a party to the present conventions.

The international exchanges should be extended to every quarter of the globe, and efforts should be made to bring the powers to realize the necessity of perfecting an institution already established which has for its object the "increase and diffusion of knowledge among men."

I gave a résumé of the contents of the above paper and was asked for some resolution which could be passed by the congress incorporating a suggestion contained in the paper "that the members of the Congress of Archivists and Librarians could do much to further the movement by lending their efforts to arouse the interest of the scientific and literary institutions and societies and governmental authorities in their respective countries, to the end that official action may be taken."

The resolution was presented in English, translated into French, and again translated into English, and appears as follows in the Library Journal:

That the scientific and literary institutions, as well as the governmental authorities of all countries, should unite their efforts to obtain the official provision for international exchanges.—VI. Q. 7. International Exchanges (Paul Brockett, Washington).

Regarding the use of the exchange service by private institutions, M. Langlois, Bibliothécaire-en-chef de l'Institut Catholique, of Paris, having experienced some difficulty in sending packages from France, presented the following resolution:

That the international exchanges should be accorded, liberally and in the interest of all workers, to establishments of private initiative (libraries of free institutions and learned societies), which conform to the general regulations and provide reciprocity.—VII. Q. 7. (M. Langlois, Paris, as amended by M. Grosjean, Bruxelles.)

I had with me a copy of Article VII of the conventions of 1886, in both English and French, which was read:

ART. VII. The bureaus of exchange will serve, in an official capacity, as intermediaries between the learned bodies and literary and scientific societies, etc., of the contracting States for the reception and transmission of their publications.

It remains, however, well understood that, in such case, the duty of the bureaus of exchange will be confined to the free transmission of the works exchanged, and that these bureaus will not in any manner take the initiative to bring about the establishment of such relations.

One more resolution was presented:

That the service of international exchanges should be developed in the most complete manner in the participating countries, and that like organizations should be created in the other States.—VIII. Q. 7. (M. Sury, Bruxelles.)

In connection with attending this congress permission was given me to visit the principal libraries of London, Paris, and Berlin, and observations were made and are contained in a series of notes taken down at the time for reference in the Smithsonian Library. When the libraries were closed, I occupied my time in visiting the museums, taking notes of methods, etc.

Respectfully submitted.

PAUL BROCKETT,
Assistant Librarian.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.



REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1912



(Publication 2156)

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REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT,

FOR THE YEAR ENDING JUNE 30, 1912.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit herewith a report showing the operations of the Smithsonian Institution and its branches during the year ending June 30, 1912, including the work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature.

The general report reviews the affairs of the Institution proper, with brief paragraphs relating to the several branches, while the appendix presents detailed reports by those in direct charge of the work. Independently of the present report, the operations of the National Museum and the Bureau of American Ethnology are fully treated of in separate volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city of Washington, and the other four shall be inhabitants of some State, but no two of them of the same State."

In regard to the personnel of the board I may here record that Dr. James B. Angell, of Michigan, resigned on January 15, 1912, after an honorable service as Regent for 25 years. The vacancy thus caused was filled by Congress by the appointment of Hon. Charles W. Fairbanks, of Indiana, who as Vice President of the United States had formerly been a Regent from 1904 to 1909. Representatives Scott Ferris and Irvin S. Pepper were appointed Regents to succeed Representatives Howard and Mann. The roll of Regents at the close of the fiscal year was as follows: James S. Sherman, Vice President of the United States, Chancellor; Edward D. White, Chief Justice of the United States; Shelby M. Cullom, Member of the Senate; Henry Cabot Lodge, Member of the Senate; Augustus O. Bacon, Member of the Senate; John Dalzell, Member of the House of Representatives; Scott Ferris, Member of the House of Representatives; Irvin S. Pepper, Member of the House of Representatives; Andrew D. White, citizen of New York; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, jr., citizen of Washington, D. C.; and Charles W. Fairbanks, citizen of Indiana.

The annual meeting of the board was held on December 14, 1911, and the usual supplementary meeting on February 8, 1912. The proceedings of these meetings and the annual report of the executive committee are printed in the customary form and the details need not therefore be repeated here.

GENERAL CONSIDERATIONS.

The affairs of the Institution and of its branches have been conducted during the year with success and, I trust, to the satisfaction of all interested. The work covers practically the entire field of natural and physical science, as well as anthropological and archeological researches. The extent of that work is limited only by the amount of the funds available. I referred in my last report to the establishment of a trust fund by Mrs. E. H. Harriman for carrying on certain research work, and I desire here to mention the generosity of several friends of the Institution who have provided means for engaging in certain biological expeditions.

The equipping of the new National Museum building with cases and the installation of the collections progressed satisfactorily. It is anticipated that during the fiscal year 1913 the building will be entirely occupied and all the exhibition halls opened to the public. The great extent of this work may be best understood by the statement that the exhibition halls embrace an area of about 220,000 square feet, or 5 acres. The installation had been so thoroughly planned by Assistant Secretary Rathbun and his associates that the work in

all the departments has advanced in an orderly and systematic fashion.

Although the new Museum building is intended primarily for the exhibition of natural-history specimens, the main floor of the large central hall has been temporarily given up to the exhibition of the collections of paintings belonging to the National Gallery of Art. It is to be noted in this connection that Mr. William T. Evans has presented 137 paintings illustrating the work of 100 American artists. This extremely valuable collection should in due time be housed in a suitable art gallery, with other valuable collections of this character belonging to the Government. The details of the development of the Museum system and accessions made to the collections will be found in the report of the assistant secretary in charge of the Museum.

As I have stated in previous reports, I believe it desirable to establish a number of research associateships similar to the Harriman trust fund, whereby especially capable men in the several branches of science may be afforded opportunities for research work without the care and burden of administrative duties, and with full assurance that as long as their work is properly conducted it will be continued, and that provision will be made for them when incapacitated for active service. The field for scientific investigation is extensive, and there are numbers of worthy projects that can not now be undertaken because of lack of means—projects that could not properly be carried on through Government appropriation, but which the Smithsonian Institution could readily undertake were the means available.

In this connection I would call attention to the organization of a Research Corporation in which the Institution is particularly interested.

Research Corporation.—Dr. Frederick G. Cottrell, of the United States Bureau of Mines, having generously offered to present to the Smithsonian Institution a valuable set of patents relating to the electrical precipitation of dust, smoke, and chemical fumes, it seemed to the Regents advisable, for various reasons incident to the business management of the patents, that there be organized a stock corporation which could take title to the patents and in which the Institution should be indirectly represented by the secretary as an individual, and not in his capacity as secretary. The recommendation of the Regents being acceptable to Dr. Cottrell, the Research Corporation of New York was accordingly organized and incorporated by certificate executed February 16, 1912, filed in the office of the secretary of state of New York February 26, 1912, and in the office of the clerk of the county of New York February 27, 1912.

The objects of the Research Corporation are explained in the following circular:

RESEARCH CORPORATION.

The Research Corporation has recently been organized under the laws of the State of New York as a self-supporting means of furthering scientific and technical research. The corporation has two objects: First, to acquire inventions and patents and to make them more available in the arts and industries, while using them as a source of income; and, second, to apply all profits derived from such use to the advancement of technical and scientific investigation and experimentation through the agency of the Smithsonian Institution and such other scientific and educational institutions and societies as may be selected by the directors. For these purposes the corporation has been capitalized at \$20,000, divided into 200 shares, but the charter provides that no dividends shall be paid and that the entire net profits shall be devoted to research; all the stock being held under a stockholders' agreement, which recites that the corporation has been organized for the purpose of aiding and encouraging technical and scientific research, and not for personal or individual profit.

At the present time many discoveries are constantly being made, which undoubtedly possess a greater or less potential value, but which are literally being allowed to go to waste for lack of thorough development. This is due, in some cases, to the fact that the inventors are men in the service of the Government, or in the universities or technical schools, who are retarded either by official positions, lack of means, or reluctance to engage in commercial enterprises; and in other cases to the fact that a discovery made incidentally in the laboratory of a manufacturing corporation does not lend itself to the particular purpose of such corporation. True conservation demands that such by-products as these shall be developed and utilized to the fullest extent of which they are capable. The Research Corporation aims to supply this demand; and, through the cooperation of the Smithsonian Institution and the universities, to carry forward the work of investigation already begun by others upon lines which promise important results and to perfect such inventions as may prove to possess commercial value, thus bringing scientific institutions into closer relations with industrial activities and furthering the improvements of industrial processes.

The establishment of the Research Corporation has been rendered immediately possible by the acquisition, through the gift of Dr. F. G. Cottrell, of the United States Bureau of Mines, and his associates, of a valuable set of patents relating to the precipitation of dust, smoke, and chemical fumes by the use of electrical currents. These devices have already been tested and are in operation in several Western States, and are fully described in an article in "Industrial and Engineering Chemistry", for August, 1911. The ownership of these patents and the exclusive control of them, except in six Western States, at once assures a certain amount of business to the corporation, and it already has contracts for preliminary installations in the Garfield Smelter of the American Smelter & Refining Co., the New York Edison Co., and the Baltimore Copper Refinery. Numerous inquiries have been received from other important plants.

Besides the patents which have already been transferred to the corporation, a number of others in various fields of industry have been offered by officers of the Government and scientific institutions, as well as by manufacturing corporations holding patents not available for their own purposes. A similar offer has also come from Germany, through Mr. Erwin Moller, who has developed certain inventions in the same field as the Cottrell patents, and undoubtedly there are many others who will be glad to have their inventions utilized for the benefit of scientific research.

The management of the corporation is in the hands of a board of directors composed of business and professional men, many of whom have had experience in large industrial and mining enterprises. Among them are Dr. Charles D. Walcott, Secretary of the Smithsonian Institution; Charles Kirchhoff, recently president of the American Society of Mining Engineers; Arthur D. Little, president of the American Chemical Society; Hennen Jennings, of Washington; Gen. T. Coleman du Pont, of Wilmington; James J. Storrow, Charles A. Stone, and Prof. Elihu Thomson, of Boston; Frederick A. Goetze, dean of the faculty of applied science of Columbia University; Elon Huntington Hooker, president of the Development and Funding Co.; Thomas C. Meadows, vice president of the International Agricultural Corporation, and Benjamin B. Lawrence and John B. Pine, of New York. Lloyd N. Scott is the secretary and Linn Bradley the engineer of the corporation.

The Research Corporation invites correspondence with industrial concerns who are interested in perfecting their operations.

All communications should be addressed to "Research Corporation, No. 63 Wall Street, New York City."

The Cottrell patents cover processes used in the precipitation of solid particles from gases and smoke produced in smelters and cement plants. Considerable injury has been suffered by orchards and crops in the neighborhood of the great cement plants in California. The Cottrell processes have met with success in removing the particles of cement from the smoke and gases of such plants and particles of lead and other metals from the smoke of smelters, as well as the abatement of smoke nuisances in general. It is expected by Prof. Cottrell that there will be great economic advantage in saving the solids in the gases and smoke.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of Smithson, 1846.....	\$515, 169. 00
Residuary legacy of Smithson, 1867.....	26, 210. 63
Deposit from savings of income, 1867.....	108, 620. 37
Bequest of James Hamilton, 1875.....	\$1, 000. 00
Accumulated interest on Hamilton fund, 1895.....	1, 000. 00
	<hr/>
	2, 000. 00
Bequest of Simeon Habel, 1880.....	500. 00
Deposit from proceeds of sale of bonds, 1881.....	51, 500. 00
Gift of Thomas G. Hodgkins, 1891.....	200, 000. 00
Part of residuary legacy of Thomas G. Hodgkins, 1894.....	8, 000. 00
Deposit from savings of income, 1903.....	25, 000. 00
Residuary legacy of Thomas G. Hodgkins.....	7, 918. 69
	<hr/>
Total amount of fund in the United States Treasury.....	944, 918. 69
Registered and guaranteed bonds of the West Shore R. R. Co. (par value), part of legacy of Thomas G. Hodgkins.....	42, 000. 00
	<hr/>
Total permanent fund.....	986, 918. 69

In addition to the above there are four pieces of real estate bequeathed to the Institution by the late R. S. Avery, some of which yield a nominal rental, and all are free from taxation.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to \$107,168.31, was derived as follows: Interest on the permanent foundation, \$58,375.12; contributions from various sources for specific purposes, \$21,150; and from other miscellaneous sources, \$27,643.19; all of which was deposited in the Treasury of the United States to the credit of the current account of the Institution.

With the balance of \$32,425.66 on July 1, 1911, the total resources for the fiscal year amounted to \$139,593.97. The disbursements, which are given in detail in the annual report of the executive committee, amounted to \$106,533.88, leaving a balance of \$33,060.09 on deposit June 30, 1912, in the United States Treasury.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1912:

International Exchanges.....	\$32, 000
American Ethnology.....	42, 000
Astrophysical Observatory.....	18, 000
National Museum:	
Furniture and fixtures.....	175, 000
Heating and lighting.....	50, 000
Preservation of collections.....	300, 000
Books.....	2, 000
Postage.....	500
Building repairs.....	15, 000
National Zoological Park.....	100, 000
International Catalogue of Scientific Literature.....	7, 500
Total.....	742, 000

EXPLORATIONS AND RESEARCHES.

Scientific explorations and researches have been carried on during the past year at the expense of the Institution as far as its limited income and the generosity of its friends would permit. The National Museum has participated in some of these enterprises by furnishing equipment or supplies or by detailing members of its staff to conduct investigations or to make collections that are subsequently transferred to the Museum. Other researches made through the Astrophysical Observatory and the Bureau of American Ethnology are referred to elsewhere in this report. The resources of the Institution not being sufficient to enable it to plan extensive investiga-

tions in the field or to maintain a corps of collectors, it is compelled to concentrate its efforts on special work of limited scope, but of such a character that the results shall, as far as possible, have an immediate bearing on the progress of science. In recent years, as in the whole of its past history, the Institution has had the aid of public-spirited citizens and the cooperation of other institutions and of the several branches of the United States Government. It has, in turn, cooperated with other organizations in the explorations which they have conducted, being itself benefited thereby and benefiting those with which it has been associated.

In recent years opportunities have been afforded for participating in a number of exploring and hunting expeditions organized by private enterprise, whereby scientific collections of great importance have been obtained. These collections, with those from other sources, are preserved in the National Museum for exhibition to the public or for promoting scientific studies.

The field of these activities of the Institution has been world-wide, but attention has been recently concentrated on Africa and the Panama Canal Zone rather more than on other regions.

STUDIES IN CAMBRIAN GEOLOGY AND PALEONTOLOGY.

During the field season of the fiscal year 1911-12, or the spring and summer of 1912, I continued the collecting of Cambrian fossils from the famous fossil locality above Burgess Pass, north of Field, British Columbia, on the main line of the Canadian Pacific Railway, for the first two weeks of July and three weeks in September.

On the way to the Canadian Northwest I stopped off for a few days to examine the locality on Steep Rock Lake, 140 miles west of Port Arthur, where the oldest pre-Cambrian fossiliferous rocks occur. I had made a small collection, when, by the swamping of the canoe in which we were working in the rapids of the Seine River, a short distance from the lake, Dr. J. W. Truman, my guide and fellow geologist, of the Canadian Survey, was drowned, and the work thus most unfortunately brought to a close.

Outfitting at Fitzhugh, on the Grand Trunk Pacific Railway, I went with a well-equipped party over the Yellowhead Pass on the Continental Divide, leaving the line of the railway at Moose River, 17 miles west of the Pass. The Moose River was followed up to its head at Moose Pass, where we passed over into the drainage of the Smoky River, making several camps en route. The final camp was made at Robson Pass, between Berg and Adolphus Lakes. A reconnaissance of the geological section from Moose Pass to the summit of Mount Robson gave approximately 12,000 feet in thickness of the Cambrian formations and 3,000 feet of Lower Ordovician strata. Fossil beds were found at several localities in this section, and one

of them on the east side of Mural Glacier promises to give the finest specimens from the Lower Cambrian rocks of the western side of the continent.

Many photographs were taken both by myself and Mr. R. C. W. Lett, of the Grand Trunk Pacific Railway, who accompanied the party for two weeks.

The scenery about Mount Robson is probably the finest in the Canadian Rockies, as far as now known. The glaciers are on a grand scale, and the geology presents many large problems for solution. My object in visiting the Mount Robson region was to secure data for comparison of the section of Cambrian rocks there with that on the line of the Canadian Pacific Railway, 150 miles to the south.

RAINEY AFRICAN EXPEDITION.

The Smithsonian African expedition, under Col. Roosevelt, had scarcely returned from the field when the Institution received invitations to participate in two others, organized to explore the same general region.

The first was Mr. Paul J. Rainey's hunting trip to British East Africa and southern Abyssinia, where Mr. Rainey especially planned to hunt lions with a pack of American hounds. The natural-history collections that might be secured were offered to the Smithsonian Institution, provided an expert field naturalist be sent to accompany him and prepare such of the game collected as was desired for exhibition or scientific study. Mr. Edmund Heller, who had accompanied the Smithsonian African expedition in such a capacity, was selected and departed with Mr. Rainey in February, 1911. The collection made has been estimated to contain some 4,700 skins of mammals, together with many birds, reptiles, and other animals, making very valuable additions to the present African collection in the Museum. Nearly all of the material is from localities not covered by earlier expeditions, and some of it comes from points never before visited by naturalists. The collection includes the famous series of lions taken by Mr. Rainey with his American hounds, as described in his well-known lectures. There are also many specimens of different kinds of antelopes, including the hartebeests, wildebeestes, and waterbucks, as well as buffaloes, zebras, cheetahs, monkeys, and rodents. A few hippopotamus and rhinoceros skins and one elephant were also collected.

A large number of birds were secured, including some of the rarest species. Many are game birds, among them guinea fowls and francolins (which resemble our partridges), and plantain eaters, crows, bustards, vultures, vulturine guinea fowl, owls, hawks, kites, secretary birds, hornbills, pigeons, parrots, sun birds, flycatchers, etc., are represented. There are also four ostrich eggs.

The party remained in the field nearly a year, having sailed from New York for Mombasa on February 18, 1911, and dispersing about February 15, 1912, at Nairobi.

The territory traversed was mostly to the north and east of that covered by the Smithsonian expedition, and included the country lying between the northern part of British East Africa and southern Abyssinia.

FRICK AFRICAN EXPEDITION.

A further natural-history expedition to Africa was that of Mr. Childs Frick, of New York, whose object was to secure a collection of animals from the territory lying to the north of the regions visited by Col. Roosevelt and Mr. Rainey, covering at the same time certain parts of Abyssinia, northern British East Africa, and the country lying about Lake Rudolf. As naturalist of this party, Dr. Edgar A. Mearns, of the Smithsonian African expedition, was chosen. A portion of the collection of birds is to be donated to the Smithsonian Institution by Mr. Frick, and already several hundred specimens have been received.

BIOLOGICAL SURVEY OF THE PANAMA CANAL ZONE.

As mentioned in my last report, the Institution organized in 1910 a biological survey of the Panama Canal Zone, with the cooperation of the Departments of State, Agriculture, Commerce and Labor, and War. At first it was intended to confine the collections to the Canal Zone proper, but as the faunal and floral areas extended to the north and south of this region, it was decided to carry the work into the Republic of Panama, a step which met with the hearty approval of that Republic. The work accomplished has been very valuable to science, including collections and observations of vertebrate animals, land and fresh water mollusks, and plants, including flowering plants, grasses, and ferns.

During the past year the botanists have continued their studies, and collections have been made of fishes, reptiles, and amphibians, birds, and mammals, and special studies and collections have been made of the microscopic plant and animal life of the fresh waters of the zone.

As can readily be imagined, the life areas on the zone will become confused as soon as the canal is opened and the waters of the Pacific and Atlantic watersheds are intermingled. It is particularly important on that account that the present geographical distribution of animals and plants be recorded prior to that time, and this is especially true as regards the life of the fresh waters and the sea-coasts.

Pamphlets have been issued from time to time descriptive of some of the new or specially interesting forms of animals and plants collected by the survey, and as soon as the mass of material has been worked up it is proposed to publish general accounts of all the various collections, and also one or more volumes containing a summary of the whole fauna and flora of the Canal Zone.

As an indication of the biological value of the survey of the zone I may mention that of grasses alone about 150 species were collected, being four to five times as many as were previously known from that region. In the collections of birds and mammals there are likewise many forms new to science.

SIBERIAN EXPEDITION.

Through the liberality of a friend, Mr. Theodore Lyman, of Cambridge, Mass., the Institution has been enabled to participate in a zoological expedition to the Altai Mountain region of the Siberia-Mongolian border, Central Asia, an exceedingly interesting territory, from which the National Museum at present has no collections. A Museum naturalist was detailed to accompany him, the expenses of the expedition being borne by Mr. Lyman, and the natural-history collections obtained to be deposited in the National Museum. Although this expedition had not completed its work at the close of the fiscal year, yet I may here anticipate some of its results by stating that the Museum will probably be enriched by a large number of interesting specimens of birds and mammals.

The scene of the survey and exploration, the Altai Mountain region, is a particularly wild country and quite unsettled, although it is well stocked with game. These mountains are inhabited by the largest of the wild sheep, which, with the ibex, will form the principal big game animals sought by the party, but a general collection of smaller mammals and of birds will also be made.

BORNEO EXPEDITION.

For more than 10 years past Dr. W. L. Abbott, of Philadelphia, has been exploring the Malay Archipelago and has given all his natural-history and ethnological collections to the Smithsonian Institution for the United States National Museum. These collections, so far as the vertebrates are concerned, are the most important ever received by the Museum from any one person. Through illness, Dr. Abbott has been obliged to abandon his exploration, but his interest in the Institution has not abated. He has engaged the services of a collector and placed at the disposal of the Institution funds for continuing the explorations he had begun in Borneo.

The field work will be carried on in eastern Dutch Borneo, the natural history of which is practically unknown. Nothing relating

to it has been published, and there are no collections from this region in the United States, although the National Museum has some from the west and south coasts of Borneo. The Institution is fortunate in having this opportunity to study a country practically unknown to zoologists. It is hoped to secure a quantity of interesting material, including the characteristic mammals of the country, such as oranges, deer, wild pigs, squirrels and smaller rodents, and possibly specimens of the rhinoceros and tapir.

BIOLOGICAL SURVEY IN THE CANADIAN ROCKIES.

Through the courtesy of the Canadian Government and of Dr. A. O. Wheeler, president of the Alpine Club of Canada, the Smithsonian Institution was enabled, in the summer of 1911, to send a small party of naturalists to accompany Dr. Wheeler on his topographical survey of the British Columbia and Alberta boundary line and the Mount Robson region. The party started in June and returned in October, 1911. The expedition was very successful in obtaining a collection covering practically all the birds and mammals inhabiting this previously unworked territory, together with many insects and botanical specimens. The land surveyed included the territory lying about this mountain in the heart of the Canadian Rockies, comprising the most rugged and broken country imaginable. Amid this wonderful scenery Mount Robson rises in titanic outline, the highest peak in Canada, probably between 14,500 and 15,000 feet high, and surrounding it for a distance of 50 miles in all directions lies the field of the survey. In this wild and unclaimed country the party of naturalists remained nearly four months, protected by special permits from the Canadian Government. The collection includes some 900 specimens of birds and mammals, the latter being of all kinds from tiny shrews to caribou and bears. One enormous grizzly bear was obtained by a fortunate shot. Much fine material for exhibition groups was secured, including a series of caribou, mountain goats, mountain sheep, beavers, and many varieties of smaller animals.

ANTHROPOLOGICAL RESEARCHES IN SIBERIA AND MONGOLIA.

Toward the close of the fiscal year arrangements were made in connection with the authorities of the exposition to be held in San Diego, California, in 1915, to carry on some interesting researches bearing on the origin of the American Indians. It was planned that Dr. Hrdlička, of the National Museum, should trace, at least in a preliminary way, the remnants of the stock of people from which in all probability the American race branched off. This is a problem which is becoming one of the most important subjects of research in

American anthropology. He was to visit the upper Yenisei region of Siberia, carrying on his studies and collections for the Museum and the exposition. From upper Yenisei he will go to Irkutsk and such other parts of Mongolia and Turkestan as he may have time to visit. After leaving Siberia he would visit Kiachtata in Chinese Turkestan, Mongolia, and then follow the road to Urga, whence he will proceed along the old caravan route to China proper.

Among the natives of the Yenisei are found physical types that seem in every essential respect to be identical with the American Indian. This type extends from the Yenisei as far as Tibet and it is the plan of Dr. Hrdlička to make a rapid survey of the numerous and little known peoples to be found in these regions, among whom it may be possible to find extensions of the same most interesting physical type which we know exists in the former place. It is his intention to come into close contact with as many of the native tribes as possible, securing photographs and casts of the individuals as well as some material objects.

ANTIQUITY OF MAN IN EUROPE.

A small grant was made to enable Dr. Hrdlička to make some special studies on the antiquity of man in Europe, especially in view of recent discoveries of remains of prehistoric man that seem to indicate great antiquity. The results of his work have not yet been published.

RESEARCHES UNDER THE HODGKINS FUND.

A limited grant has been made from the Hodgkins fund to enable Mr. Anders Knutson Ångström to make certain observations on nocturnal radiation from the earth at Bassour, Algeria, in connection with observations to determine the variability of the sun, which have been in progress there under Mr. Abbot, of the Smithsonian Astrophysical Observatory. The results of Mr. Ångström's researches are awaited with interest.

As mentioned in my last report, the Institution has arranged for the distribution to various parts of the world of standard silver disk pyrheliometers designed by Mr. Abbot, of the Astrophysical Observatory, with a view of securing accurate data and more exact knowledge of solar radiation and the influence of the terrestrial atmosphere upon it.

A portion of the income of the fund is devoted to the increase and diffusion of knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man. There was published a few years ago a number of papers on "Expired air," "Organic matter in air," "The air of towns," and other phases of this

general subject. There is now in preparation by Dr. Leonard Hill, associated with Dr. Martin Flack and other investigators of the London Hospital Medical College, a paper discussing the results of experiments to determine the influence of the atmosphere upon our health and comfort in confined and crowded places.

SMITHSONIAN TABLE AT NAPLES ZOOLOGICAL STATION.

For the past 19 years the Smithsonian Institution has maintained a table for the use of American biologists at the Naples Zoological Station. This table affords exceptional opportunities for the study of marine life, and it is believed that through its use the cause of biological science has been much advanced.

The appointment of Dr. Sergius Morgulis, a Parker Traveling Fellow from Harvard, which was approved for the months of May, June, and July, was continued until July 22, 1911.

Dr. Ch. Zeleny, of the University of Illinois, who was appointed for one month, including part of June and July, continued his occupancy until July 26, 1911. At the close of the fiscal year no report had been received from Dr. Zeleny in regard to the work accomplished.

Dr. Fernandus Payne, assistant professor of zoology at the Indiana University, carried on researches at Naples during the months of April, May, and June, 1912. His studies included: (a) Selective fertilization, (b) Cleavage factors, and (c) Some pressure experiments. In a brief report on his work, Dr. Payne states that he has (1) completed a paper on "The Chromosomes of *Grylloptalpa borealis*," (2) collected a large amount of material on *Grylloptalpa vulgaris*, and expects to study the question of synapsis, ring formation, chondriosomes, and the sex chromosomes in this form.

When the same period is selected by more than one student the earliest application is considered first, the approval of the later ones becoming necessarily dependent on the ability of the station to provide for more than one Smithsonian appointee at the same time. It should be added that the obliging courtesy shown in this connection to appointees of the Smithsonian Institution by the director of the station often permits appointments to the seat which would otherwise be impracticable.

The prompt and efficient aid of the advisory committee in examining and reporting on applications for the table is, as it has always been, of great service to the Institution and is very gratefully appreciated.

The Institution has renewed the lease of the table for another period of three years.

PUBLICATIONS.

One of the chief agencies of the Institution in promoting "the diffusion of knowledge among men" is the publication and distribution throughout the world of the series of "Smithsonian Contributions to Knowledge," the "Smithsonian Miscellaneous Collections," and the Smithsonian Annual Report. These three series constitute the publications of the Institution proper and, with the exception of the annual report, are printed entirely at the expense of Smithsonian funds. Other publications issued under the direction of the Institution, but at the expense of the Government, include the Proceedings, Bulletin, and Annual Report of the United States National Museum; the Bulletin and Annual Report of the Bureau of American Ethnology; and the Annals of the Astrophysical Observatory.

The "Smithsonian Contributions to Knowledge" is a quarto series begun in 1848, which now comprises 35 volumes of about 600 pages each, including, up to the present time, 148 memoirs. The chief characteristic of these memoirs is that they are discussions of extensive original investigations, constituting important additions to knowledge.

The "Smithsonian Miscellaneous Collections" is an octavo series containing papers of varying length, from two or three pages to an entire volume, being special reports on particular subjects of biological or physical research, classified tabular compilations, tables of natural constants, bibliographies, and other miscellaneous information of value to the scientific worker or student. This series was begun in 1862 and now numbers 60 volumes of about 800 pages each, with an aggregate of several thousand articles.

Limited editions of each memoir in the "Contributions" and of articles in the "Collections" are distributed to specialists in the subjects treated; but the principal distribution of these series during the last 60 years has been to about 1,100 large libraries and institutions of learning in the United States and throughout the world.

The Annual Report of the Board of Regents, known as the Smithsonian Report, is printed under congressional appropriation and in much larger editions than the other series. It is in great measure a popular work, containing, besides the official report on the business operations of the Institution, a general appendix made up of 30 or more original or selected articles bearing on particular advances in human knowledge and discoveries and showing the progress of science in all its branches. It is a publication much sought after.

Smithsonian Contributions to Knowledge.—The Langley Memoir on Mechanical Flight, which had been in preparation for several years, was completed and published in August, 1911. It is a work of 330 pages of text and 101 plates of illustrations. It is the third memoir in volume 27 of the "Contributions," following Secretary

Langley's "Experiments in Aerodynamics," and "The Internal Work of the Wind," published in 1891 and 1893, respectively. The present memoir was in preparation at the time of Mr. Langley's death in 1906, and the part recording experiments from 1887 to 1896 was written by him. The chapters discussing experiments from 1897 to 1903 were written by Mr. Charles M. Manly, who became chief assistant to Mr. Langley in 1898.

In the preface to the Memoir, Mr. Manly says:

The present volume on Mechanical Flight consists, as the title-page indicates, of two parts. The first, dealing with the long and notable series of early experiments with small models, was written almost entirely by Secretary Langley, with the assistance of Mr. E. C. Huffaker and Mr. G. L. Fowler, in 1897. Such chapters as were not complete have been finished by the writer and are easily noted, as they are written in the third person. It has been subjected only to such revision as it would have received had Mr. Langley lived to supervise this publication, and has therefore the highest value as an historical record. The composition of the second part, dealing with the later experiments with the original and also new models and the construction of the larger aerodrome, has necessarily devolved upon me. This is in entire accordance with the plan formed by Mr. Langley when I began to work with him in 1898, but it is to me a matter of sincere regret that the manuscript in its final form has not had the advantage of his criticism and suggestions. If the reader should feel that any of the descriptions or statements in this part of the volume leave something to be desired in fullness of detail, it is hoped that some allowance may be made for the fact that it has been written in the scanty and scattered moments that could be snatched from work in other lines which made heavy demands upon the writer's time and strength. It is believed, however, that sufficient data are given to enable any competent engineer to understand thoroughly even the most complicated phases of the work.

Persons who care only for the accomplished fact may be inclined to underrate the interest and value of this record. But even they may be reminded that but for such patient and unremitting devotion as is here enregistered the now accomplished fact of mechanical flight would still remain the wild unrealized dream which it was for so many centuries.

To such men as Mr. Langley an unsuccessful experiment is not a failure, but a means of instruction, a necessary and often an invaluable stepping stone to the desired end. The trials of the large aerodrome in the autumn of 1903, to which the curiosity of the public and the sensationalism of the newspapers gave a character of finality never desired by Mr. Langley, were to him merely members of a long series of experiments, as much so as any trial of one of the small aerodromes or even of one of the earliest rubber-driven models. Had his health and strength been spared, he would have gone on with his experiments undiscouraged by these accidents in launching and undeterred by criticism and misunderstanding.

Moreover, it is to be borne in mind that Mr. Langley's contribution to the solution of the problem is not to be measured solely by what he himself accomplished, important as that is. He began his investigations at a time when not only the general public but even the most progressive men of science thought of mechanical flight only as a subject for ridicule, and both by his epoch-making investigations in aerodynamics and by his devotion to the subject of flight itself he helped to transform into a field of scientific inquiry what had before been almost entirely in the possession of visionaries.

The original plans for this publication provided for a third part, covering the experimental data obtained in tests of curved surfaces and propellers. Owing to the pressure of other matters on the writer, the preparation of this third part is not yet complete and is reserved for later publication.

Smithsonian Miscellaneous Collections.—In this series there were published during the past year 35 papers forming parts of three volumes and covering a wide range of topics. I may mention the Hamilton lecture by Dr. Simon Flexner on "Infection and Recovery from Infection," three papers by your secretary on Cambrian Geology and Paleontology, several papers descriptive of new genera and species of birds, mammals, and other animals and plants from Smithsonian expeditions in the Panama Canal Zone, Africa, and Canada, as enumerated in the editor's report on another page, and an interesting paper on "The Natives of the Kharga Oasis, Egypt," by Dr. Hrdlička, who discusses the physical measurements and other observations made by him on these people dwelling in an oasis 130 miles west of Luxor, the ancient Thebes. Dr. Hrdlička says:

The type of the Kharga natives is radically distinct from that of the negro. It is, according to all indications, fundamentally the same as that of the non-negroid Valley Egyptians. It is in all probability a composite of closely related northeastern African and southwestern Asiatic, or "hamitic" and "semitic" ethnic elements, and is to be classed with these as part of the southern extension of the Mediterranean subdivision of the white race.

Judging from the mummies of the Oasis inhabitants from the second to fifth centuries A. D., exhumed at El Baguat, the type of the present nonnegroid Kharga natives is substantially the same as that of the population of the Oasis during the first part of the Christian era. The nature of the population of the Oasis in more ancient times can only be determined by skeletal material from the ancient cemeteries.

Smithsonian report.—The annual report for 1910, issued during the past year, contained in the general appendix 34 interesting papers of the usual high character, and of many of them it was necessary to publish extra editions to meet the public demand. The report for 1911 was all in type before the year closed, but unavoidable delays prevented its publication.

Zoological nomenclature.—In continuation of the series of Opinions Rendered by the International Commission on Zoological Nomenclature, there were published two pamphlets containing Opinions 30 to 37 and 38 to 51. The Institution cooperates with this commission by providing clerical assistance for its secretary in Washington and in the publication of its Opinions. In connection with the summary of each opinion there is printed a statement of the case and the discussion thereon by members of the commission. The rules to be followed in submitting cases for opinion¹ as laid down by the commission are as follows:

¹ Cases should be forwarded to the secretary of the commission, Dr. Ch. Wardell Stiles, U. S. Hygienic Laboratory, Washington, D. C.

1. The commission does not undertake to act as a bibliographic or nomenclatural bureau, but rather as an adviser in connection with the more difficult and disputed cases of nomenclature.

2. All cases submitted should be accompanied by (a) a concise statement of the point at issue, (b) the full arguments on both sides in case a disputed point is involved, and (c) complete and exact bibliographic references to every book or article bearing on the point at issue.

The more complete the data when the case is submitted the more promptly can it be acted upon.

3. Of necessity, cases submitted with incomplete bibliographic references can not be studied and must be returned by the commission to the sender.

4. Cases upon which an opinion is desired may be sent to any member of the commission, but—

5. In order that the work of the commission may be confined as much as possible to the more difficult and the disputed cases, it is urged that zoologists study the code and settle for themselves as many cases as possible.

Museum publications.—There were published during the year the annual report of the assistant secretary in charge of the National Museum for 1911, 50 miscellaneous papers of the Proceedings, 3 Bulletins, and 5 parts of Contributions from the National Herbarium.

Ethnological publications.—The Bureau of American Ethnology published the Twenty-seventh Annual Report, containing a paper on "The Omaha Tribe," and Bulletin 47 on the Biloxi and Ofo languages.

Reports of historical and patriotic societies.—In accordance with the national charters of the American Historical Association and the National Society of the Daughters of the American Revolution, annual reports of those organizations were submitted to the Institution and communicated to Congress.

Committee on printing and publication.—The advisory committee on printing and publication under the Smithsonian Institution has continued to examine manuscripts proposed for publication by the branches of the Institution and has considered various questions concerning public printing and binding. Twenty-one meetings of the committee were held during the year and 156 manuscripts were passed upon. The personnel of the committee is as follows: Dr. Frederick W. True, Assistant Secretary of the Smithsonian Institution, chairman; Mr. C. G. Abbot, Director of the Astrophysical Observatory; Mr. W. I. Adams, disbursing officer of the Smithsonian Institution; Dr. Frank Baker, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Smithsonian Institution; Mr. F. W. Hodge, ethnologist in charge of the Bureau of American Ethnology; Dr. George P. Merrill, head curator of geology, United States National Museum; and Dr. Leonhard Stejneger, head curator of biology, United States National Museum.

Allotments for printing.—The allotments to the Institution and its branches, under the head of "Public printing and binding," during the past fiscal year, aggregating \$72,900, were, as far as practicable,

expended prior to June 30. The allotments for the year ending June 30, 1913, aggregating \$74,900, are as follows:

For the Smithsonian Institution, for printing and binding annual reports of the Board of Regents, with general appendixes.....	\$10, 000
For the annual reports of the National Museum, with general appendixes, and for printing labels and blanks, and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half turkey or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum library.....	34, 000
For the annual reports and bulletins of the Bureau of American Ethnology, and for miscellaneous printing and binding for the bureau....	21, 000
For miscellaneous printing and binding:	
International Exchanges	200
International Catalogue of Scientific Literature.....	100
National Zoological Park.....	200
For miscellaneous printing and binding for the Astrophysical Observatory, \$400, and for 1,500 copies of volume 3 of the Annals of the Astrophysical Observatory, \$2,000.....	2, 400
For the annual report of the American Historical Association.....	7, 000
Total.....	74, 900

Distribution of publications.—There was under discussion before committees of Congress at the close of the fiscal year, and later enacted into law, certain proposed measures which particularly affect the practice of the Institution and its branches in the distribution of publications. As finally passed by Congress the law requires that all Government publications must be mailed from the Government Printing Office, mailing lists or labels being forwarded to the Superintendent of Documents for that purpose.

At the Regents' meeting in February last, the secretary called the attention of the board to the proposed legislation and stated that the publications of the Institution are not an incidental result of its work but something planned for and systematically executed. The Institution keeps in touch with all the principal scientific and art establishments of the world, and with experts in science and art who are promoting work in a line with its own, or who are in positions to help in securing collections, information, or advice. The actual labor of wrapping, labeling, and handling the Smithsonian report had been furnished by the Institution and not by the Government, and it was feared that the transfer of the actual work of distribution of the publications of the Institution and its branches to another establishment would distinctly tend to defeat the well-considered plans under which it has been conducted heretofore.

The law as enacted requires the transfer to the Public Printer by October 1 of all publications on hand, and that distribution shall thereafter be made from his office. This measure does not, however, apply to the two series of publications published at the private

expense of the Institution. The question in the main seems to be one affecting the promptness of distribution, which is of primary importance in the case of scientific works, and it is hoped no serious disadvantages may result by the adoption of the new law.

LIBRARY.

The library of the Smithsonian Institution is made up of several constituent parts. The most important of these are the Smithsonian deposit in the Library of Congress and the libraries of the National Museum and Bureau of American Ethnology. There was added to the Smithsonian deposit during the past year a total of 21,863 publications, the equivalent of 14,560 volumes, consisting very largely of works on the various branches of science and art.

To the Museum library there were added 1,791 books, 3,608 pamphlets, and 276 parts of volumes, making the present total in that library about 42,000 volumes, 70,000 unbound papers, besides manuscripts, maps, charts, and other material. Arrangements are being made to divide the Museum library into two principal parts by assembling all books on zoology, paleontology, geology, ethnology, and archeology in the new building.

LANGLEY MEMORIAL TABLET.

A design in plaster for the memorial tablet commemorative of the aeronautical work of the late Secretary Langley was submitted at the December meeting of the Regents by the sculptor, Mr. John Flanagan, and accepted by the committee appointed by the board. The tablet will be cast in bronze and erected in the vestibule of the Smithsonian building. The tablet, which is in relief, measures 4 feet 6 inches high by 2 feet 5 inches wide. It represents Mr. Langley seated on a terrace where he has a clear view of the heavens, and in a meditative mood is observing the flight of birds, while in his mind he sees his aerodrome soaring above them.

The lettering upon the tablet is as follows:

SAMUEL PIERPONT LANGLEY

1834-1906

Secretary of the Smithsonian Institution

1887-1906

Discovered the relations of speed and angle of inclination to the lifting power
of surfaces moving in air

"I have brought to a close the portion of the work which seemed to be specially mine, the demonstration of the practicability of mechanical flight.

"The great universal highway overhead is now soon to be opened."—LANGLEY, 1901.

HAMILTON LECTURE.

The third Hamilton fund lecture of the Smithsonian Institution was delivered by Dr. Simon Flexner, of the Rockefeller Institute for Medical Research, in the auditorium of the United States National Museum, February 8, 1912.

The title of the lecture was "Infection and Recovery from Infection," an investigation to which Dr. Flexner has given especial study for several years.

In his treatment of this vital and interesting subject the speaker covered a broad field of medical science, and at the same time expressed himself in such a manner as to be intelligible to laymen. Dr. Flexner touched upon the following points:

The part played by bacteria, protozoa, and submicroscopic parasites in causing infection was described, and emphasis laid upon the occurrence on the surface of the body of many kinds of disease-producing germs. The manner in which they are excluded by skin and mucous membranes was discussed, as well as their ability to enter the body by these channels when they were imperfect. In this way a variety of diseases is produced, including diphtheria, meningitis, and probably infantile paralysis. The germs that enter the body encounter a second and even more efficient set of defenses in the blood with its devouring white corpuscles. When disease appears, in spite of and because of inadequacy in the defensive mechanisms, then the body, under the influence of the parasitic germs, sets about creating new defensive principles through the process of immunization. It is immunization that vaccination produces, which is a protection to smallpox; and it is through purposive immunization of animals that the curative serums are prepared, that by injection bringing about an artificial and premature cessation of such diseases as diphtheria and epidemic meningitis. The part played by insects in transmitting malaria, yellow fever, typhus fever, and relapsing fever was sketched, and the varying susceptibilities to disease of different races, species, and individuals dwelt on and in part explained, on the basis of known facts of immunity to and virulence of the germ causes of disease.

The above is the third of the series of Hamilton lectures. In 1871 James Hamilton, a retired lawyer of Carlisle, Pennsylvania, bequeathed \$1,000 to the Smithsonian Institution, the interest of which was to be appropriated biennially by the secretary for some contribution, paper, or lecture on any scientific or useful subject which he might select. As the sum was somewhat limited to adequately carry out the donor's wishes, the interest was allowed to accumulate until the amount was doubled, and the Institution then created a series of lectures, known as the Hamilton Fund Lectures.

The first, by Dr. Andrew D. White, on "The diplomatic service of the United States, with some hints toward its reform," was given in 1905, and the second, by Dr. George E. Hale, on "Some recent contributions to our knowledge of the Sun," was delivered in 1908.

INTERNATIONAL CONGRESSES AND CELEBRATIONS.

The Institution each year receives invitations to numerous scientific congresses and celebrations in the United States and abroad, but as funds are not available for the expenses of delegates few of these invitations can be accepted. In some instances, however, it is possible to arrange for representation by collaborators of the Institution who are visiting the localities on official or private business.

Congress of Americanists.—Dr. Aleš Hrdlička was appointed representative of the Institution and designated as delegate of the United States to the Eighteenth International Congress of Americanists held in London May 27 to June 1, 1912. In addition to Dr. Hrdlička, the State Department also designated Miss Alice Fletcher, Dr. George Grant MacCurdy, Dr. Edgar L. Hewett, Dr. G. B. Gordon, Rev. Charles W. Currier, Prof. Marshall H. Saville, and Dr. Charles Peabody as delegates on the part of the United States at that congress.

The Nineteenth International Congress of Americanists has been invited to meet in Washington in 1914, and Mr. W. H. Holmes, Mr. F. W. Hodge, and Dr. Aleš Hrdlička have been appointed an auxiliary committee to represent the Smithsonian Institution in connection with the preliminary arrangement of details respecting the proposed meeting.

Academy of Natural Sciences of Philadelphia.—The Academy of Natural Sciences of Philadelphia held its centenary anniversary in Philadelphia, March 19, 20, and 21, 1912. At this celebration the Institution and its branches were represented by the secretary, Dr. Charles D. Walcott; Dr. Richard Rathbun, assistant secretary in charge of the United States National Museum; Dr. Frederick W. True, assistant secretary in charge of Library and Exchanges; Mr. Frederick W. Hodge, ethnologist in charge, Bureau of American Ethnology; and Dr. Leonhard Stejneger, head curator of biology, United States National Museum; and Dr. Theodore N. Gill, associate in Zoology, United States National Museum. The secretary also represented the American Philosophical Society on this occasion.

Archeological Congress.—At the request of the Institution, the State Department designated Prof. Arthur L. Frothingham and Prof. George M. Whicher as delegates on the part of the United States to the Third International Archeological Congress at Rome, October 9 to 16, 1912.

Prehistoric Anthropology.—Dr. Alš Hrdlička, Dr. Charles Peabody, and Dr. George Grant MacCurdy were appointed representatives of the Smithsonian Institution to the Fourteenth International Congress of Prehistoric Anthropology and Archeology at Geneva, September 9 to 15, 1912.

Congress of Orientalists.—Dr. Paul Haupt was appointed representative of the Smithsonian Institution and designated as delegate of the United States at the Fifteenth International Congress of Orientalists, held at Athens, April 7 to 14, 1912. Additional delegates on the part of the United States were Prof. C. Washburn Hopkins, Prof. A. V. W. Jackson, and Prof. Morris Jastrow, jr. (Unforeseen circumstances later prevented Prof. Jackson from attending.)

Congress on Hygiene and Demography.—The Fifteenth International Congress on Hygiene and Demography was invited by the Government, through the State Department, to meet in Washington, September 23 to 28, 1912. I accepted the invitation of the department to serve as a member of the committee on organization. Mr. W. H. Holmes, head curator of anthropology in the National Museum, has been appointed as representative of the Smithsonian Institution on the interdepartmental committee to consider the preparation of exhibits for the congress. At the close of the fiscal year, June 30, 1912, arrangements for the congress were well in hand.

Congress on Applied Chemistry.—In connection with the Eighth International Congress of Applied Chemistry, to be opened in Washington September 4, 1912, and subsequent meetings closing in New York City September 13, Prof. F. W. Clarke has been designated as representative of the Institution, and I have accepted an invitation to attend personally.

Royal Society.—Dr. Arnold Hague, of the United States Geological Survey, was appointed a representative of the Smithsonian Institution at the commemoration of the two hundred and fiftieth anniversary of the foundation of the Royal Society of London, July 16 to 18, 1912.

GEORGE WASHINGTON MEMORIAL BUILDING.

There is now pending in the House of Representatives a bill passed by the Senate, April 15, 1912, granting to the George Washington Memorial Association permission to erect on the Government reservation known as Armory Square, a memorial building to cost not less than \$2,000,000, "where large conventions or in which large public functions can be held, or where the permanent headquarters and records of national organizations can be administered." By the provisions of the bill the control and administration of the building would be vested in the Board of Regents of the Smithsonian Institution, and the association is to provide "a permanent endowment

fund of not less than \$500,000, to be administered by the Board of Regents of the Smithsonian Institution, the income from which shall, as far as necessary, be used for the maintenance of said building."

There is need in Washington of such a structure as here proposed. It would be a fitting memorial to George Washington—the gathering-place and headquarters for patriotic, scientific, medical, and other organizations interested in promoting the welfare of the American people, the development of the country in science, literature, and art.

NATIONAL MUSEUM.

The past year was marked by a new feature in the administration of the National Museum—its opening to the public on Sundays. This measure had long been advocated without effect, and even now the practice must be for a time limited to the new building. Public appreciation was evidenced on the first day of Sunday opening, October 8, 1911, by the presence of 15,467 visitors. The average number of visitors on Sundays up to the close of the year was 1,666, as compared with 693 on week days.

There was added to the permanent collections of the Museum a total of 238,000 specimens and objects, an increase of 10,000 over the year preceding. Of these accessions about 168,000 were biological, 63,000 geological and paleontological, and 7,000 anthropological. A large number of valuable temporary additions in the form of loans were made to the National Gallery of Art, to the collection of art textiles, and to those of the division of history. Among the accessions that I may specially mention are the first aeroplane (Wright) acquired by the Government; important memorials of Gens. Gansevoort and Custer, Rear Admirals Foote and Schley, Commanders Maury and Hosley, and other eminent soldiers and sailors, and mementos of the Washington, Ball, Cropper, McLane, Bradford, and Bailey-Myers-Mason families; some interesting Polish coins dating from 1386 to 1835; and a very large and unique series of postage stamps and other objects relating to the operation of the United States Postal Service. There were also received about 4,000 mammals, besides birds, reptiles, fishes, and invertebrates from the Paul J. Rainey expedition to British East Africa; a large collection of Cambrian fossils; and an unrivaled collection of some 75,000 specimens of fossil echnioderms deposited by Mr. Frank Springer. From the Bureau of Fisheries were received extensive and important collections of fishes from Japan and the Philippines and over 27,000 specimens of marine invertebrates. Other additions of importance are noted by the assistant secretary in his report on another page.

About three-fourths of the exhibition space in the new building has already been made accessible to the public, and before the close

of another year it is expected that the last of the halls will be opened. The installations, however, are to a large extent provisional and much work will still remain to be done to complete their permanent arrangement.

By the transfer of the natural history and anthropological exhibits to the new building, space has become available in the older buildings for the better exhibition of the large collections of the department of arts and industries. The very interesting series of objects commemorative of eminent Americans and of important events in the history of the United States; the collections illustrative of art textiles, graphic arts, and ceramics, as well as firearms, electrical inventions, and other technological material may now receive more attention and be more adequately displayed than has heretofore been practicable.

The picture gallery in the new building, constituting the National Gallery of Art, continues to grow in public interest and importance. A special exhibition of part of the collection of American and oriental art presented to the Nation by Mr. Charles L. Freer was held from April 15 to June 15. The objects displayed included 38 paintings by Whistler, Tryon, and others, 13 Japanese paintings, 36 Chinese paintings, a number of Chinese bronzes, one dating back to 1766-1122 B. C., and examples of Chinese, Persian, and Mesopotamian pottery, ancient Egyptian glass, and Persian and Indo-Persian illuminations. Mr. William T. Evans, of New York, has made 10 important additions to his collection of works of contemporary American painters, now numbering 137 pieces by 98 artists.

A meeting in memory of Mr. Francis D. Millet, lost in the *Titanic* disaster, was held in the auditorium of the new building on the evening of May 10, 1912, under the auspices of The American Federation of Arts, when addresses were made by Senators Root and Lodge, and others. On this occasion I called attention to the valuable services rendered to the Smithsonian Institution by Mr. Millet as chairman of the advisory committee of the National Gallery of Art.

Meetings of a number of scientific organizations were held as usual in the auditorium, including the usual annual April meeting of the National Academy of Sciences, the annual meeting of the American Association for the Advancement of Science, the American Institute of Architects, and the Red Cross conference.

On March 28 and 29 the Washington Academy of Sciences held a *conversazione* and an exhibition of important recent apparatus, methods, and results pertaining to the scientific investigations carried on by the different Government bureaus and scientific institutions of Washington.

Models and pictures of designs for the memorials to Abraham Lincoln and Commodore Perry were exhibited in several rooms of the new building and attracted much public attention.

The publications issued included the annual report for 1911, numerous papers of the Proceedings, and several Bulletins, which will be enumerated in detail in the usual volume devoted to the operations of the National Museum.

BUREAU OF AMERICAN ETHNOLOGY.

The operations of the Bureau of American Ethnology during the last year are stated in detail on another page by the ethnologist-in-charge of that branch of the Institution's activities. The systematic researches bearing on the history, languages, manners, and customs of the American Indians cover a wide range, and the results of these studies are published as soon as completed. Since the organization of the bureau under the Smithsonian Institution in 1879, 27 annual reports in 32 royal octavo volumes have been issued, and more than 50 bulletins, the collection comprising a most valuable ethnological library. The demand for the "Handbook of American Indians," which is printed in two volumes, has so far exceeded the authorized edition that a measure has been introduced and is now pending in Congress for reprinting it.

The recent field work of the bureau includes:

(1) A visit to El Morro, New Mexico, where impressions of some Spanish inscriptions dating from the year 1606 and having an important bearing on the early history of the Pueblo tribes, were made; (2) excavations in the Jemez Valley in a ruined pueblo on a mesa 1,800 feet high, the ruins bearing evidence of occupancy at two different periods, and containing some interesting pottery, traces of textiles, and other objects; (3) field work to determine the western limit of the ancient Pueblo culture in Arizona; and many other lines of investigation, discussed by Mr. Hodge in an appendix to this report.

The construction of the Panama Canal has aroused so greatly public interest in the aboriginal remains of the West Indies that the bureau has arranged for more extended studies in West Indian archeology. Researches thus far made indicate that the Tainan culture of Porto Rico and the Dominican Republic was represented in the Lesser Antilles by an agricultural people, probably Arawak, who were conquered and absorbed by the marauding Carib. Types of pottery found in some of the Lesser Antilles indicate their occupancy by people superior in culture to the Carib and to those found there at the time of the discovery by Columbus.

INTERNATIONAL EXCHANGES.

There has been an increase of more than 10 per cent in the number of packages handled by the Exchange Service during the past year as compared with the preceding 12 months, the total number being 315,492. These packages weighed over 284 tons.

No change has been made in the amount (\$32,200) granted by Congress during the past four years for the support of this branch of Government work carried on under the direction of the Institution, and the usual sum was collected from various Government and State establishments for services in connection with the transportation of exchanges, the total available resources for meeting the expenses of the system being \$36,591.02.

The publications dispatched by the Exchange Service are classified under four heads: First, the Congressional Record; second, "Parliamentary documents"; third, "Departmental documents"; fourth, "Miscellaneous scientific and literary publications."

The term "Parliamentary documents" as here used refers to publications set aside by law for exchange with foreign Governments, and includes not only copies of documents printed by order of either House of Congress, but copies of each publication issued by any department, bureau, commission, or officer of the Government. The object in sending these publications abroad is to procure for the use of the Congress of the United States a complete series of the publications of other Governments, and the returns are deposited in the Congressional Library.

The term "Departmental documents" embraces all the publications delivered at the Institution by the various Government departments, bureaus, or commissions for distribution to their correspondents abroad, from whom they desire to obtain similar publications in exchange. The publications received in return are deposited in the various departmental libraries.

The "Miscellaneous scientific and literary publications" are received chiefly from learned societies, universities, colleges, scientific institutes, and museums in the United States and transmitted to similar institutions in all parts of the world.

At the request of the Secretary for the Interior of the Union of South Africa the Institution discontinued the sending of full sets of governmental documents to Cape Colony and the Transvaal and partial sets to Natal and the Orange River Colony, substituting one full set for the Government of the Union of South Africa. There are therefore now sent through the Exchange Service to regular foreign depositories only 54 full and 32 partial sets of official documents.

No countries were added during the year to the list of those with which the immediate exchange of official parliamentary journals is carried on, the number of countries taking part in this exchange being 29.

NATIONAL ZOOLOGICAL PARK.

The accessions to the collections in the National Zoological Park during the past year aggregated 510 animals, including 25 species not already represented; 350 of these were obtained by purchase, exchange, or as gifts, and 108 were born and hatched in the park. The total collection on June 30 numbered 1,551 individual animals, representing 381 species of mammals, birds, and reptiles, an increase of 137 over the preceding year. The more important additions were 2 elephant seals and 4 northern fur seals, 8 white pelicans, and a pair each of Brazilian tapirs, Patagonian cavies, and Chilean eagles. The number of visitors was 542,738, or a daily average of 1,487. The largest number in any one month was 95,485, in April, 1912. That the educational value of the park is appreciated is indicated by the fact that it was visited by 4,140 pupils, representing 142 schools and classes from the District of Columbia and neighboring States, and from Vermont, Massachusetts, New York, and Tennessee.

Although each year some improvements are made as regards the accommodation of the collections and the comfort of visitors, yet much remains to be done before the park can be brought to a condition that would properly be expected in a zoological park maintained by this great nation. The most important improvement of the year was the construction of a fireproof building for a central heating plant, in which are installed two pairs of boilers for alternate use as repairs or cleaning become necessary. A yard and bathing pool was also constructed for the use of the hippopotamus and the tapirs; three small inclosures were built for semiaquatic animals; and various other additional structures were built, as enumerated by the superintendent in his report on another page.

I have for several years called attention to the urgent need of a suitable aviary for the fine series of birds in the collection. A suitable structure for this purpose is estimated to cost about \$80,000. Around this large aviary would be grouped the cages for the eagles, vultures, condors, and owls, now scattered irregularly about the grounds.

The superintendent in his report calls attention also to several other desirable measures for the betterment of the park.

The Biological Survey of the Department of Agriculture, in cooperation with the Zoological Park, is carrying on some experiments in breeding mink with a view to ascertaining the possibilities of rearing them in captivity for commercial purposes. The main object in view is to secure data relative to the best methods of rearing mink for their fur, especially as to details of housing, feeding, mating, and caring for them.

ASTROPHYSICAL OBSERVATORY.

The principal research carried on by the Astrophysical Observatory during the year has been on the variability of the sun. Progress has been made in the dissemination of standards of pyrheliometry and on the absorption of radiation by atmospheric water vapor.

The first of these investigations was in continuation of observations taken during several years past to definitely determine the laws governing the apparent variability of the "solar constant." The solving of this problem, it is expected, will be of much value in the probable forecast of climatic conditions from year to year. In this research it seemed important that simultaneous observations be made in widely separated parts of the world. It was accordingly arranged to make such observations at Mount Wilson, California, and at Bassour, Algeria. The results of this work are discussed by Mr. Abbot in his report on another page.

For several years the Institution has been sending to observatories, widely separated throughout the world, standardized copies of the standard silver-disk secondary pyrheliometer designed by the director of the Smithsonian Astrophysical Observatory. During the past year about 10 such instruments have been prepared and sent out, mostly to foreign governmental meteorological services. It is hoped to thus secure not only uniformity of radiation measures, but also a more exact knowledge of solar radiation and the influence of the terrestrial atmosphere upon it.

In carrying forward the research on the absorption of radiation by atmospheric water vapor, there has been recently devised at the observatory a method for determining spectroscopically the total quantity of water vapor between the observer and the sun. Atmospheric water vapor absorption work during the year was confined to the upper infra-red spectrum bands. It is expected by the use of a vacuum bolometer now in preparation to make considerable gain in the sensitiveness of the apparatus and greatly promote the value of the work at great wave lengths.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The cooperative enterprise known as the International Catalogue of Scientific Literature is represented in the United States through the Smithsonian Institution, an appropriation being made each year by Congress to maintain a regional bureau in this country under the auspices of the Secretary of the Institution.

This bureau, in cooperation with thirty-one other regional bureaus, through a central bureau in London, publishes yearly 17 volumes, which form an index to current scientific literature. Each country

supports its own bureau, in the majority of cases by means of direct governmental grants. The London central bureau, which bears all of the expense of editing and publishing the data prepared by the regional bureaus, depends for its support entirely on funds received from the subscribers to the work. In the beginning of the enterprise the subscription price was fixed at \$85 per year for a full set of 17 volumes, and it has been necessary to maintain this price, as there are a limited number of libraries and scientific bodies whose subscription to the work practically assures the sum necessary for publication. The lack of any surplus, however, renders it impossible to reduce the price of the work in order to meet the demands of a large number of scientific investigators, who are practically excluded as personal subscribers to this valuable source of information owing to the present prices.

Had the central bureau a permanent and independent income, derived from an endowment or otherwise, it would be possible to adopt the course which would under similar circumstances be followed by a commercial publishing house having a liberal working capital; that is, to reduce the price of the publication and depend on the certainty of increased sales to pay the relatively small expenses of printing a larger edition of the work. An endowment of \$100,000 properly invested would, it is believed, make it possible to carry out this plan, and, for the end to be accomplished, it would be difficult to find a better use for this comparatively small sum. A more detailed statement of the condition of this interesting example of what may be accomplished through international cooperation will be found in the report of the bureau in the appendix.

Respectfully submitted.

CHARLES D. WALCOTT, *Secretary*.

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APPENDIX 1.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the operations of the United States National Museum for the fiscal year ending June 30, 1912:

SUMMARY OF THE YEAR'S PROGRESS.

By the close of the year the natural history departments of the Museum had been quite fully established in the new building, only a small amount of exhibition material remaining to be transferred. The laboratories had been occupied for some time, and the reserve collections brought over from the older buildings had been mainly arranged in the more ample and convenient quarters provided for them. The work of classification had necessarily to be in large part suspended during the period of moving, but the opportunity was availed of to expedite the labeling and recording, and these collections are now, as a whole, in much better condition and far more accessible for reference and study than at any previous time in the history of the Museum. The task of moving was both arduous and delicate, involving, as it did, the handling of several million specimens of all sizes and all degrees of hardness without injury and without the loss or disarrangement of labels. That it was accomplished satisfactorily in such a remarkably short space of time is especially gratifying, in view of the fact that the exigencies of the current work were fully met and no cessation occurred in the receipt of new material.

The installation of the exhibition collections, however, could not be hastened in the same way. A much greater time is required for the construction of the cases, which are more elaborate in character than those intended for storage, and but few of the cases used in the older buildings are adapted to the new building, though many have been temporarily employed. It has also been necessary to reject a large number of the older exhibition specimens as of inferior quality for the purpose, and of those which are being utilized many require to be thoroughly renovated if not entirely done over. The new exhibitions, however, are intended to consist in great measure of fresh materials, much of which has been recently acquired, and to represent

the best skill of the museum preparator and taxidermist. During the year this branch of the work was pressed to the fullest extent possible, and excellent progress was made.

Of the total floor area of about 465,000 square feet furnished by the new building, the amount of space dedicated to the public, including the floors and galleries of the south pavilion and rotunda, is slightly in excess of 220,000 square feet. The permanent exhibitions now planned are limited to the first and second stories of the wings and ranges, which they will completely occupy and which contain about 186,000 square feet. Of this space about three-fourths has been opened to the public, although it should be explained that the installations are still to a large extent provisional and subject to revision, a work that is steadily going on. The end of another year, however, should see all of the exhibition halls opened and in good though not finished condition.

The exhibitions to which the public had gained access by the close of the year comprised, besides the picture gallery in the middle hall, ethnology, historic archeology, systematic and applied geology, mineralogy, paleontology, the birds and fishes, small sections of the mammals and invertebrates, a synoptic series of biology, and certain special zoological collections illustrating anatomy and development, albinism, melanism, hybridism, the domestic animals, and the local fauna. The principal branches that remained to be opened up were the mammals, reptiles, marine invertebrates, and prehistoric archeology.

The removal of the natural history collections from the older buildings furnishes the opportunity for the more complete organization of the department of the arts and industries as contemplated in the original plan of the Board of Regents. Certain subjects belonging to it have for a long time been illustrated to the extent permitted by the crowded condition of the exhibition halls, among them being land and water transportation, firearms, electrical inventions, measuring devices, many kinds of machinery, the graphic arts, and ceramics. There are several others, however, equally important and interesting, of which the Museum has many and valuable illustrations. The material, obtained from various sources, but mainly from the great international expositions, has, from lack of room, been necessarily kept in storage, though before the crowding of the older buildings began some parts of it were exhibited. The space that has been released will afford accommodations for the installation of this material, so far as it has not deteriorated, and for such additions as will be needed to round out the exhibits of the several subjects in at least a modest way. With this accomplished, the Museum will be confronted with the problem of the further develop-

ment of the department to make it comparable with those in the principal European countries, and thus capable of exerting a direct and beneficial influence on the higher industrial pursuits of the country.

It was not until after the middle of the year, however, that the extension of the work in this direction could be taken up, and little more was possible than to remove the material from storage, and begin its unpacking and assorting. The installations will be made, at least for the most part, in the old cases, which will have to be more or less remodeled for the purpose, but it is not expected that the public will be long delayed in gaining access to some parts of these collections. The material relating to the graphic arts and to book-making will be exhibited in the Smithsonian building, but the other subjects will be mainly provided for in the older Museum building, and comprise, besides those above mentioned, mineral technology, textiles, woods, various animal and vegetable products, foods and drugs, etc. The division of history will continue to occupy its present position in the older Museum building, as will the collection of art textiles, but additional space will be required for the former, whose growth and popularity have been exceptionally gratifying.

Several unoccupied rooms in the new building were used by the Government for the competitive plans for the Lincoln and Perry memorials, authorized by Congress and submitted during the year. Opened to the inspection of the public, the models and pictures of the designs for the Lincoln monument in Washington were still on exhibition at the close of the year.

The Sunday opening of the Museum, so long and earnestly advocated by the authorities of the Institution, was one of the most noteworthy accomplishments of the year. This innovation is, in fact, to be regarded as marking the beginning of a new period in the history of the Museum, in which its privileges may be enjoyed with equal freedom by all classes. Started on October 8, 1911, and restricted to afternoon hours, it is for the present limited to the new building.

ADDITIONS TO THE COLLECTIONS.

The permanent additions to the collections numbered approximately 238,000 specimens and objects, of which about 168,000 were biological, 63,000 geological and paleontological, and 7,000 anthropological. There were also many loans, some of great value.

The more important accessions in anthropology related to the Indians of southern Alaska and Panama, and included an interesting series of objects from the ruined pueblo of Kwasteyukwa, New Mexico. To the exhibits in mechanical technology were added many important articles, including the first aeroplane acquired and used by the Government, a large number of firearms, both military and sporting, and numerous examples of inventions. The division of

American history was especially favored with both gifts and loans, among the distinguished persons and families represented by the memorials received being Gen. Peter Gansevoort, of Revolutionary time, and his son and grandson; Rear Admirals Winfield Scott Schley and Andrew H. Foote, United States Navy; Commanders Matthew Fontaine Maury and Harry H. Hosley, United States Navy; Gen. George A. Custer, United States Army; the Marquis de Lafayette; Prof. George Frederic Barker; Mr. and Mrs. Samuel S. Cox; Julia Ward Howe; the Washington and Ball families; the Cropper and McLane families; the Bradford family, of New England; and the Bailey-Myers-Mason family. The collection of numismatics acquired two valuable series of several hundred pieces each, one representing the Polish coinage from 1386 to 1835, the other consisting of antique copper coins from Asia. Exceptionally important was the transfer to the National Museum of the museum of the Post Office Department, so well known to visitors to Washington, comprising the large and unique series of United States postage stamps, besides many objects relating to the operations of the postal service.

The most conspicuous acquisition by the department of biology consisted of the collection made by Mr. Paul J. Rainey on his expedition to British East Africa, accompanied by Mr. Edmund Heller, which was generously presented. It contains about 4,000 mammals, besides many hundreds of birds, reptiles, fishes, and invertebrates, and has already yielded a large number of new forms. Much material was also received from several other natural history expeditions beyond the United States conducted by the Institution and Museum or under other auspices, the principal regions visited having been the Aleutian Islands, British Columbia and Alberta, the Panama Canal Zone, the Bahama Islands, Peru, Abyssinia and British East Africa, the Altai Mountains on the borders of Siberia and Mongolia, Kashmir, and Borneo. Within the confines of the United States a number of minor explorations were carried on by members of the staff.

The transfers made by the Bureau of Fisheries were extensive and important, consisting mainly of collections that had been studied and described and containing much type material. The fishes were from Japan, the Philippine Islands, and various parts of the United States, while the marine invertebrates, numbering over 27,000 specimens of several groups, represented explorations by the steamer *Albatross* in different parts of the Pacific Ocean. The increases in the division of insects were chiefly from the Bureau of Entomology, and in the herbarium from the Bureau of Plant Industry, though many specimens were secured for the latter by exchange and as the result of field work in New Mexico.

The collections of geology and mineralogy received important additions, including types and recently described materials and many fine examples of building and ornamental stones. The permanent acquisitions in paleontology, amounting to over 60,000 specimens, were mainly of Cambrian fossils from British Columbia and Alberta, and from China; Ordovician fossils from the western United States, New York, and Canada; Ordovician and Mississippian fossils from the Mississippi Valley; and Tertiary fossils from the Isthmus of Panama. It is gratifying to note the deposit in the Museum by Mr. Frank Springer of his unrivaled collection of fossil echinoderms, numbering some 75,000 specimens, which he has been many years in assembling and on which no expense has been spared. The material has been installed and made accessible in one of the larger laboratory rooms, and it is the purpose of Mr. Springer to devote much of his time to further research work in connection with it.

NATIONAL GALLERY OF ART.

A memorable event in the brief history of the Gallery was the exhibition in one of the great halls of the new building of a selection of objects from the collection of American and oriental art presented to the Nation in 1906 by Mr. Charles L. Freer, of Detroit, Michigan, but which is to remain in the possession of the donor during his life. This special exhibition, which continued during two months, from April 15 to June 15, and opened with an evening reception, was made possible through the courtesy and generosity of Mr. Freer, by whom the expenses of transportation were defrayed.

The selection, which numbered 175 pieces out of the more than 4,000 composing the Freer collection, was representative of its characteristic features, and in variety, richness, and rarity of material constituted in itself a remarkable exhibit for any place or time. The American art side of the collection was illustrated by 38 paintings, of which 24 were by James McNeill Whistler and the others by Thomas W. Dewing, Dwight W. Tryon, Abbott H. Thayer, and Winslow Homer. Of oriental productions there were 13 Japanese paintings of the sixteenth to the nineteenth centuries; 36 Chinese paintings, the earliest belonging to the Liang dynasty, and also 4 albums of Chinese paintings; 17 Chinese bronzes, one dating back to the Shang dynasty, many centuries before the Christian era; 4 Chinese sculptures of the Wei and T'ang dynasties; 52 examples of old Chinese, Corean, Japanese, Persian, and Mesopotamian pottery; 7 specimens of ancient Egyptian glass; and 4 Persian and Indo-Persian illuminations.

Mr. William T. Evans, of New York, whose generous benefactions have extended through more than five years, made 10 important additions to his collection of the works of contemporary American

painters, which, at the end of the year, numbered 137 pieces by 98 artists. One of the older paintings was also exchanged for another and better example of the work of the same artist. This collection, which occupies the greater part of the space now allotted to the Gallery, is a most notable presentation of American art. The painters represented in the contributions of the year are William B. P. Closson, Wyatt Eaton, Albert L. Groll, Arthur T. Hill, William M. Hunt, William S. Robinson, Abbott H. Thayer, Elihu Vedder, Edgar M. Ward, Frederick J. Waugh, and Irving R. Wiles. Mr. Evans also added 34 proofs of American wood engravings to his previous donation of 81 examples.

The collection of historical paintings in oil was increased by two noteworthy gifts to the Nation. One of these consisted of portraits of Mathias Ringmann, Martin Waldseemuller, and Vautrin Lud, the geographers who, in 1507, first applied the name "America" to the new continent, and was received from the municipality of St. Dié-des-Vosges, France. The other comprised a portrait of John Ericsson and a painting illustrating the "Combat between the *Monitor* and the *Merrimac*," and was made by the Swedish American Republican League of Illinois. The Gallery was also fortunate in obtaining many loans, both of paintings and sculpture, and within the restricted limits of its quarters has maintained an exhibition of exceptional merit and attractiveness.

ART TEXTILES.

Interest in the collection of art textiles, under the patronage and direction of Mrs. J. W. Pinchot, continued unabated, and of 68 additions received 15 were gifts. The laces have now become sufficiently well represented to permit the arrangement of a synoptical series in which all of the varieties are shown, and of a special exhibit constituting a résumé of the history of lace making.

PERIOD COSTUMES.

During the year a collection of costumes intended to illustrate the changes in style of personal attire in America from the colonial period to the present time, was undertaken. The material so far gathered has consisted mainly of apparel actually worn at important state and social functions, which gives it an historical interest, and the collection should also very materially supplement that of art textiles, offering useful suggestion in the field of design. The subject was taken up on the initiative of Mrs. Julian James, who is giving it her personal attention, and the contributions, ranging from single objects to complete parts of costumes, comprised both loans and gifts.

MISCELLANEOUS.

Of duplicates separated from the collections in the course of the work of classification about 8,000 specimens, chiefly minerals, ores, fossils, and recent animals, were distributed to schools and colleges for teaching purposes. About 16,000 duplicates were also used in making exchanges, whereby material of similar value was obtained for addition to the permanent collections. To specialists connected with other scientific establishments some 11,500 specimens, mainly biological, were sent for study, principally in the interest of the Museum and for the purpose of securing the identification of material which could not be determined here.

The number of persons who visited the new building during the year was 281,887, the older Museum building, 172,182, and the Smithsonian building, 143,134, being equivalent to an average daily attendance at each of the three buildings of 800, 550, and 457, respectively. The total Sunday attendance at the new building, beginning October 8, amounted to 64,987, an average by Sundays of 1,666 persons, or more than double the daily average for the same building.

The publications issued during the year comprised the annual report for 1911, volumes 39, 40, and 41 of the Proceedings, and 3 Bulletins, besides 59 papers from the Proceedings, Bulletins, and Contributions from the National Herbarium, printed separately. The total number of copies of publications distributed was about 67,000.

The library received additions to the extent of 1,791 books, 3,608 pamphlets, and 276 parts of volumes, and at the end of the year was estimated to contain a total of 42,002 books and 69,670 unbound papers. With the completion of the arrangements in progress all of the works on natural history will be transferred to the new building, leaving the older quarters for those relating to the arts and industries and history, and by this division the congested condition of the library which has so long prevailed will be relieved.

The facilities offered by the new building were often availed of during the year for congresses and meetings relating to science and art. Among the more important bodies which met or were received there were the American Association for the Advancement of Science and affiliated societies, the National Academy of Sciences, the American Federation of Arts, the American Institute of Architects, and the Red Cross Conference.

Respectfully submitted.

RICHARD RATHBUN,

Assistant Secretary in Charge U. S. National Museum.

Dr. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

OCTOBER 31, 1912.

APPENDIX 2.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: I have the honor to submit the following report of the operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1912, conducted in accordance with the act of Congress approved March 4, 1911, making appropriations for sundry civil expenses of the Government, which act contains the following item:

American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archæologic remains, under the direction of the Smithsonian Institution, including salaries or compensation of all necessary employees and the purchase of necessary books and periodicals, including payment in advance for subscriptions, forty-two thousand dollars.

SYSTEMATIC RESEARCHES.

The systematic researches of the bureau were conducted by the regular staff, consisting of eight ethnologists, and with the aid of specialists not directly connected with the bureau, but the results of whose studies were procured for publication. These operations may be summarized as follows:

Mr. F. W. Hodge, ethnologist-in-charge, was occupied with administrative affairs during the greater part of the year, but from time to time, as opportunity afforded, he was engaged in the preparation of an annotated Bibliography of the Pueblo Indians, with the result that almost 1,100 cards bearing titles, descriptions of contents, etc., of writings pertaining to the Pueblos were completed. Knowledge of the Pueblo Indians commenced with the year 1539, and these people have been the subject of so much attention by early Spanish explorers and missionaries, as well as by ethnologists and others, in recent years, that the literature has become voluminous and widely scattered. The need of a guide to this array of material has been greatly felt by students, and for this reason Mr. Hodge has prepared notes on the subject for a number of years with the view of their final elaboration in the form of a bibliography.

Late in August Mr. Hodge proceeded to New Mexico, and after a brief visit to the archeological sites in the Rito de Los Frijoles, northwest of Santa Fé, where excavations were conducted in conjunction with the School of American Archæology in 1911, continued

to El Morro, or Inscription Rock, about 35 miles east of Zuñi, for the purpose of making facsimile reproductions, or squeezes, of the Spanish inscriptions there, which have such an important bearing on the early history of the Pueblo tribes. El Morro is a picturesque eminence of sandstone rising from the sandy valley, and by reason of the former existence of a spring at its base, which is now merely a seep, it became an important camping place of the early Spaniards on their journeys to and from the Rio Grande and the Zuñi and Hopi pueblos. The inscriptions of these early explorers were carved near the base of the rock, chiefly on the northern and southern sides of the highest portion of the mesa, and in the main consist of the names of the visitors with the dates of their visits, but in a number of cases elaborated with a more or less full statement of the object of the journey.

The earliest of the inscriptions is that of Juan de Oñate, the colonizer of New Mexico and founder of the city of Santa Fé, who inscribed his name and the object of his visit in 1606, on his return from a perilous journey to the Gulf of California. Others who visited the rock and left a record are, in order of date: Gov. Francisco Manuel de Silva Nieto, who escorted the first missionaries to Zuñi in 1629; Juan Gonzales, probably a member of the small military escort accompanying the same party, and bearing the same date (1629); Lujan, who visited Zuñi in 1632 to avenge the murder of Fray Francisco Letrado, one of the missionaries who accompanied Silva Nieto; Juan de Archuleta, Diego Martin Barba, and Agustin de Ynojos, 1636; Gov. Diego de Vargas, 1692, the conquerer of the Pueblos after their rebellion in 1680 which led to their independence of Spanish authority during the succeeding 12 years; Juan de Uribarri, 1701; Ramon Paez Hurtado, 1709; Ju. Garcia de la Rivas, Feliz Martinez, and Fray Antonio Camargo, 1716; Joseph de Payba Basconzelos, 1726; Juan Paez Hurtado and Joseph Truxillo, 1736; Martin de Elizacochea (bishop of Durango) and Juan Ignacio de Arrasain, 1737; and others of the eighteenth century. These inscriptions were all carefully photographed by Mr. Jesse L. Nusbaum, with whose aid Mr. Hodge made paper squeezes which were brought to Washington and transferred to the National Museum, where Mr. Nusbaum later made plaster casts of the paper negatives, insuring the permanent preservation of the inscriptions in this manner. This work was accomplished none too soon, since deterioration by weathering is progressing in some parts of the cliff face bearing the inscriptions, while vandalism is perhaps playing an even more serious part in the destruction of these important historical records, notwithstanding the fact that El Morro has been created a national monument by Executive order.

Early in September Mr. Hodge joined Dr. Edgar L. Hewett, director of the School of American Archæology, and his assistants, in the Jemez Valley, about 65 miles northwest of Albuquerque, for the purpose of conducting excavations, under the joint auspices of the bureau and the school, in an extensive ruined pueblo on a mesa 1,800 feet in height, skirting the valley on the west. This village was occupied within the historical period by the Jemez people, by whom it is known as Kwasteyukwa. The ruins cover an area approximately 850 by 600 feet, and even on partial excavation exhibited distinct evidence of occupancy at two different periods. The original pueblo was considerably larger than the one later inhabited, although the latter was built on the ruins of the older and of the same materials. The walls were of tufa blocks, rudely shaped and set in adobe mortar; the rooms were small, the masonry crude, and practically none of the walls remain standing above ground. A large artificial reservoir in a northwestern angle of the ruin furnished the water supply, and various smaller depressions probably mark the sites of kivas. The later inhabitants—those within the historical period, or about the first half of the seventeenth century—buried their dead in and beneath the débris of the older part of the pueblo. The mortuary accompaniments were of the usual character, speaking in general terms—pottery, traces of textiles, stone and bone implements and other objects, and a few ornaments. The finding of glass beads with the remains of a child, and an iron nail in another grave, bear testimony of the comparatively recent occupancy of the village by the Jemez Indians. It was the custom of the inhabitants to throw large stones into the graves, resulting in the breaking of almost all the pottery deposited with the dead. The fragments were carefully preserved, however, and will be repaired by the National Museum. A noteworthy specimen of pottery bears in its decoration a feather design almost identical with feather symbols found on ancient pottery of the Hopi, and therefore tending to verify traditions of the latter people that some of their ancestral clans came from the Jemez.

Dr. J. Walter Fewkes, ethnologist, was engaged in field work from July to October, having especially in view the determination of the western limits of the ancient Pueblo culture in Arizona. Outfitting at Jerome, in that State, he proceeded to certain large ruins on the upper Verde, on Oak Creek, and in Sycamore Canyon, where some time was spent at each locality in photographing and in making plans of these and adjacent remains, as well as in a study of the formerly occupied caves near the mouth of Oak Creek. Crossing the rough country separating the upper course of Oak Creek and the great sandstone cliffs known as the Red Rocks, Dr. Fewkes revisited and further studied the large cliff dwellings, known as Honanki and

Palatki, excavated by him in 1895. Several hitherto undescribed ruins were added to the list of ancient remains in this general vicinity.

From the Red Rocks Dr. Fewkes returned to the Verde and followed that stream upward to the Jordan ranch, where cliff houses of an instructive character were photographed and studied. He also investigated on the hills back of Cornville certain large stone structures of the type known to Spanish-speaking people as *trincheras*, rude but massive fortifications that here begin to assume importance. A number of ruins hitherto unrecorded belonging to the cave- or cliff-dwelling type were observed in the walls of Sycamore Canyon, or Dagoon Fork, and the outlines of stone houses were seen above the river terrace near the junction of Sycamore Creek and Verde River. A large aboriginal fort, with walls well preserved, was found on a height overlooking the Verde, above the mouth of Granite Creek, and others more nearly destroyed were seen at the Baker ranch and in Hell Canyon, not far from Del Rio Station. Near the Baker ranch, a mile or two down the Verde, are the remains of a cliff dwelling, directly in the line of a projected railroad, which will probably be destroyed when the road is constructed. Dr. Fewkes also visited the ruins of several fragile-walled habitations, consisting of low mounds, near Jerome Junction and Del Rio. Although many evidences of such ancient dwellings are here seen, most of the foundation walls have been carried away by settlers and used in their own house building.

A large fort, with well-preserved walls, occupies a low limestone ridge east of Williamson Valley, above the trail from Del Rio westward, and commanding a view of the valley west of Jerome. This fort is typical of the *trincheras* that appear more and more frequently as one proceeds westward from the upper Verde. Several inconspicuous ruins, hitherto undescribed, were found in Williamson Valley, those situated on the hills belonging to the fortification type, while those in the valleys consist merely of low mounds of stone and other débris.

Proceeding westward from Chino Valley, many interesting ruins were observed along the valley of Walnut Creek, referred to in Lieut. A. W. Whipple's report of 1853 as Pueblo Valley, once noted as the site of old Camp Hualapai. This vale, from Aztec Pass to the point where the creek is lost in the sands of Williamson Valley, was extensively tilled in prehistoric times, as is attested by the well-marked remains of ancient irrigation ditches. Characteristic petroglyphs were also found in Walnut Valley.

As elsewhere in this region, two types of ruins were observed in Walnut Valley, namely, (1) extensive stone fortifications with massive walls crowning the hilltops on both sides of the valley and commanding a wide view, and (2), on the low terraces bordering the stream, clusters of small mounds constituting the remains of farm-

houses, upright posts supporting walls of wattling plastered with mud like the *jacales* of the Mexicans and evidently identical in their general character with the dwellings of certain Yuman tribes. Among the best preserved of the forts, called "pueblos" by Whipple, are those near Aztec Pass and at Drew's ranch, Shook's ranch, and Peter Marx's ranch, while others are found farther down Walnut Creek. No trace of terraced pueblo dwellings were seen in this region.

In order to shed further light on the relations of the two types of ruins described, Dr. Fewkes made an examination of the ancient remains along the Agua Fria and near Prescott. At both places the ruins were found to be of the same dual character. In a few instances, as at Frog Tanks, near the mouth of the Agua Fria, the ruins suggest the great houses or compounds of the Salt and Gila Valleys, but here also *trincheras* and fragile-walled houses are the more common.

The observations made by Dr. Fewkes during this field season indicate that the ruins in the region referred to are the remains of buildings so different in architecture from that of true pueblos that it is probable the culture of their occupants was also different. Dr. Fewkes reached the conclusion that the ruins of the forts and small dwellings referred to were constructed and used by a Yuman people whose descendants, more or less mixed with Apache and other non-related tribes, are represented to-day by the Hualapai, Yavapai, and Havasupai Indians. Although the *jacal* domiciles of western Arizona were probably structurally similar to certain ancient houses in the Pueblo region of New Mexico, the river-terrace houses of Walnut Valley were more like certain habitations of the lower Gila River than they were the pueblos of the Rio Grande.

On returning to Washington Dr. Fewkes prepared a report on his observations in this interesting archeological field, which, with suitable illustrations, is now in press as one of the accompanying papers of the twenty-eighth annual report.

Dr. Fewkes also gave considerable time to reading the proofs and arranging the illustrations of his memoir on Casa Grande, which likewise is to appear in the twenty-eighth annual report.

On the completion of the above work Dr. Fewkes commenced the preparation of another paper, relating to "Designs on Prehistoric Hopi Pottery," a subject to which he devoted much attention in connection with his studies of the Hopi Indians for 20 years. This memoir, which was well advanced toward completion at the close of the fiscal year, accompanied by numerous plates and text figures, is designed as a key to the interpretation of the decoration of ancient Hopi earthenware. The great multiplicity of life designs appearing on the pottery of ancient Sikyatki are treated in the paper, in which

modifications in decorative devices derived from feathers, birds, and other animals, and conventional figures are likewise discussed. One object of Dr. Fewkes's treatise is to meet a growing desire of those interested in primitive symbolism, and another is to define the peculiarities of one ceramic area of the Pueblos as a basis for comparison with others, thus facilitating the study of Pueblo culture origins and prehistoric migration routes.

As the construction of the Panama Canal has tended to stimulate an interest in aboriginal remains in the West Indies, and as many archeological specimens differing from those of the Antilles previously known are now being brought to light, the time for a scientific study of them, as well as of the aboriginal sites of the West Indies, has arrived. Much of the interest recently manifested in early Indian life in the West Indies may be ascribed to Dr. Fewkes's memoir on "The Aborigines of Porto Rico and Neighboring Islands," which appears in the twenty-fifth annual report. Since the publication of this paper the new material has become so abundant that plans have been made for Dr. Fewkes to resume his study of West Indian archeology. The most noteworthy collection of aboriginal objects from this area made in recent years is that of George G. Heye, Esq., of New York, who courteously has placed his material at the disposal of the bureau as an aid to these investigations. This collection has been studied by Dr. Fewkes and the most important objects contained therein are now being drawn for illustrative purposes.

Dr. Fewkes's researches thus far indicate that the so-called Tainan culture of Porto Rico and San Domingo was represented in the Lesser Antilles by an agricultural people, probably Arawak, who were conquered and absorbed by the marauding Carib. Study of the collections above noted tend to show that several of the Lesser Antilles were marked by characteristic types of pottery, indicating their occupancy by a people superior in culture to the Carib and to those found there at the time of the discovery by Columbus. New light has been shed on the relations of these early Antillean people and the Orinoco tribes, which, although generally called Carib, were probably an antecedent people of higher culture.

Mr. James Mooney, ethnologist, spent the first three months of the fiscal year in continuing investigations among the East Cherokee of western North Carolina, and in locating and investigating mixed-blood remnant bands in the eastern part of that State. The Cherokee work consisted chiefly of a continuation and extension of the study of the aboriginal sacred formulas of the priests and doctors of the tribe, with the accompanying ceremonies and prescriptions. Although the former dances and tribal gatherings have fallen into disuse, the family rites and medical ceremonies still hold sway among the full bloods.

The so-called "Croatan Indians" of southeastern North Carolina were found to be an important and prosperous community, numbering about 8,000, evidently of Indian stock with admixture of negro and white blood, and closely resembling the Pamunkey Indian remnant tribe in Virginia, but with no survival of Indian language or custom and with almost no knowledge of their own history. After years of effort they have secured definite State recognition as an Indian people. There is no foundation in fact for the name "Croatan Indians," which they themselves now repudiate, and in all probability they represent the mixed-blood descendants of the aboriginal tribes of the region which they now occupy. The existence was also established, and the location ascertained, of several smaller bands of similar mixed-blood stock, but without official recognition, in the eastern section of the two Carolinas.

The remainder of the year was devoted by Mr. Mooney to the compilation of material in connection with his pending study of Indian population. By reason of the shifting, disintegration, and new combinations of tribes, no one section can be treated separately or finally as apart from others. Considering the difficulties met in a study of this kind, the work is making satisfactory progress.

Dr. John R. Swanton, ethnologist, devoted most of the year to field researches among the Creek Indians in Oklahoma. These investigations continued from the middle of September, 1911, to the middle of May, 1912, during which period excursions were made into Texas to visit the Alibamu Indians and for the purpose of endeavoring to trace remnants of other Texas tribes, and to the Caddo Indians of southwestern Oklahoma. No remains of Texas tribes, of ethnologic value, other than the Alibamu, were located, but a considerable mass of material was obtained from the latter. Dr. Swanton's visit to the Caddo was with the view of learning how many of the old Caddo dialects were still spoken, and some valuable documentary material was obtained in Natchitoches, Louisiana. No words of Haiish, supposed to be quite distinct from the other Caddo dialects, could be gathered, but evidence was obtained that it resembled Adai. In the course of his Creek investigations Dr. Swanton visited and made photographs of every busk ground of the Creeks and Seminole still maintained, and information was gathered regarding the organization of the "big house" in each, as well as in those that have been abandoned. Dr. Swanton devoted July and August, 1911, mainly to the study of the Hitchiti and Natchez languages, and the period subsequent to his return to Washington in May, 1912, was occupied in copying his field notes and in incidental work on the Timucua language of ancient Florida, as preserved in Father Pareja's writings, with the view of determining whether Timucua bears any relation to the languages of the Muskogean stock.

On his way from Oklahoma to Washington, Dr. Swanton stopped at Bloomington, Indiana, for the purpose of representing the bureau at the fifth annual meeting of the Mississippi Valley Historical Association, before which he read a paper on "De Soto's line of march, from the point of view of an ethnologist."

Mrs. M. C. Stevenson, ethnologist, continued her field researches of the Tewa tribes of New Mexico throughout the fiscal year, devoting attention particularly to those of San Ildefonso and Santa Clara, and incidentally to the Tewa of Nambe and San Juan. The pueblo of Pojoaque is now practically extinct as an Indian settlement, only about six Tewa remaining in that village. Special attention was devoted to the religious, political, and social organizations of these peoples, which, owing to their extreme conservatism, are difficult to determine. The Tewa are divided not only into clans with patrilineal descent, but each tribe consists of a Sun people and an Ice people, each with its own kiva, or ceremonial chamber. At San Ildefonso the kiva for the Sun people is known as Po'tée, "Squash kiva," and that of the Ice people is Kun'iyä'tée, "Turquoise kiva." The element *tée* signifies "round," hence indicating that originally the Tewa kivas were circular. A third kiva of San Ildefonso is called Téepoa'te, meaning "Round gathering or sitting place," and symbolizes a lake. Although from its trim condition this kiva appears to be modern, it is in reality very old, and within the memory of the older men of San Ildefonso it was used whenever the Sun and Ice people met together, because of its large size. Large councils are still held in the Téepoa'te, and it is used also as a dressing room for the dancers participating in ceremonies. The kivas are also the meeting places of the sacred fraternities. The Squash, Summer Bear, and Fire organizations of San Ildefonso hold their ceremonies in the kiva of the Sun people. The Fire fraternity was adopted in the ancient past from a people in the north who lived in skin tipis, wore clothing of dressed deerskin, and spoke a strange tongue. This fraternity finally became extinct, and, wishing to reestablish it, the San Ildefonso people sent four men to the Sun people of Zuñi (whose Fire fraternity, according to tradition, had a similar origin), who initiated them into their order, thus enabling them to revive the fraternity at San Ildefonso. The Galaxy and Turquoise fraternities meet in the Turquoise kiva. The members of the former organization have a fraternity chamber adjoining this kiva, and at the great Buffalo festival its members frequent the chamber as well as the kiva.

Each fraternity at San Ildefonso has a tablet altar, which is erected on the western side of the kiva, while the participants in the ceremonies sit facing eastward. These people have interesting animal fetishes and many human images of stone representing their anthropic gods. They appeal to their zoöic deities to heal diseases inflicted by

sorcery, and all ceremonies connected with these supplications are dramatic in character. Anthropic gods, principally ancestral, are invoked for rain and the fructification of the earth. The present priest of the Sun people is director of the Summer Bear fraternity, and he is also the keeper of the calendar. He must observe the daily rising and setting of the sun and must watch the rising and setting of the moon. Elaborate solstice ceremonies are performed. Those for the summer solstice are held in the kiva of the Sun people. The Ice people join the Sun people in the summer ceremonies, and the Sun people join the Ice people in the ceremonies of winter. In each kiva the two rain priests sit side by side, the priest of the Ice people always at the right of the priest of the Sun people, while officers associated with each priest sit in line with him. The prayers of the priest of the Sun people are for the purpose of bringing rain, and in order that they may be answered he must live an exemplary life. The same beliefs control the functions of the priest of the Ice people, who, through the ceremonies which he directs, is expected to induce cold rains and snow that the earth may not become hot and destroy the vegetation. All male children are initiated, either voluntarily or involuntarily, into the kiva of the Sun or of the Ice people. When a husband and his wife belong to different sides, the kiva to which the child shall belong is selected by mutual agreement, and a representative of that kiva is chosen as his ceremonial father immediately after the birth of the child. From birth to death the lives of the Tewa are almost a continuous ceremony. The ceremonial father ties native cotton yarn around the wrists and ankles of the new-born child, that its life may be made complete. The initiation ceremonies of the young men are very elaborate, and many miles are traveled on foot to the summit of a high mountain where the final ceremonies are performed. Although the Tewa are professed Christians, they adhere tenaciously to their native religion and rituals; and while the church performs marriage and burial services, the Indians still cling to their native marriage feasts and mortuary ceremonies.

The cosmogony of the Tewa is elaborate and complicated and bears closer resemblance to that of the Taos Indians than to that of the Zuñi. The original sun and moon are believed always to have existed, but the present sun and moon were born of woman after the world and all the people were destroyed by a great flood. The myth associated with the creation of these deities and with their exploits is of great interest.

The masks of the anthropic gods are never seen outside of the kivas of San Ildefonso. There is a great variety of these masks, many of them similar to those of the Zuñi. They are held in great secrecy.

Rattlesnakes, sacred to the fraternities, are captured when young and are reared in rooms adjoining the kivas. A fluffy eagle feather is attached to the head of the snake when caught, and the snake is held captive with a string sufficiently long to allow it considerable freedom until it becomes accustomed to its new surroundings, when the string is removed. Small openings in the chamber allow the snakes to pass in and out. In one ceremony, which takes place at daylight, the snakes are handled outdoors, but on such occasions the pueblo is so patrolled that spying by outsiders is impossible, although Mexicans live almost in the heart of the village. The Santa Clara people likewise make use of live snakes in certain ceremonies, and they also have a large owl which they keep secreted as carefully as are the snakes.

The government of the Tewa differs somewhat from that of the Zuñi. While the governor of the Zuñi has to do with civic matters only, a Tewa governor has absolute power over all matters concerning his tribe except those controlled exclusively by the rain priests and the war priests. Mrs. Stevenson's studies of the natal rites of the Tewa indicate that they are more like those of the Sia than of the Zuñi, while the religious ceremonies connected therewith more closely resemble those observed by the Taos people. The child is baptized in accordance with aboriginal customs before the baptismal rite of the church is performed. At the present time the infant is usually carried in the arms instead of on the back of the mother, but the small, flat cradle, with top, and headrest with turquoise setting, is made as it was centuries ago.

The material culture of the Tewa is in many respects similar to that of the Zuñi. They were adept in the textile art in early days when cotton, milkweed, yucca, and the hair of native animals were employed in weaving, but this industry became lost after the introduction of sheep by the Spaniards, for the Tewa, like the Taos people, came to depend upon the Zuñi and Hopi traders for woven garments, and also for textile paraphernalia for use in ceremonies. One or two Tewa have revived the weaving industry to some extent—a San Ildefonso man learned the process from Santo Domingo, and a man of Santa Clara acquired it from the Navaho. The dainty baby moccasins are now seldom seen, but the women still wear moccasins with heavy leg wrappings during ceremonies, while at other times a well-dressed sheepskin boot tied below the knee is worn, for deer-skin has become rare. Native beads are now very seldom seen. Mrs. Stevenson's study of Tewa ceramics has convinced her that those who decorate their pottery apply their designs, especially the conventional patterns, with little understanding of their symbolism, the significance of which has become extinct. When questioned the potters always have a ready answer; hence students are often deceived. With

the exception of the black ware of Santa Clara, the pottery of the Tewa has greatly deteriorated.

Mrs. Stevenson has been enabled to record the names of the sacred mountains of the Tewa people, as well as the myths associated with them. In their general beliefs and customs the Tewa are found to be intermediate between the Taos and the Zuni.

The beginning of the fiscal year found Dr. Truman Michelson, ethnologist, engaged in an investigation among the Fox Indians near Tama, Iowa, with whom he remained until the middle of August, when he proceeded to Oklahoma, where he initiated researches among the Sauk Indians of that State. Dr. Michelson was very successful in recording the myths and tales of the Foxes, which covered about 2,300 pages of texts. He obtained likewise some notes on the ceremonial and social organization of that tribe, but these are neither full nor complete, as the Foxes are, without exception, the most conservative of the Algonquian tribes within the United States. While among the Sauk Dr. Michelson, with the aid of a native interpreter, translated some of the Fox myths and tales collected in Iowa, but his chief work in Oklahoma consisted of gaining an insight into the Sauk ceremonial and social organization. He also translated, with the assistance of a Sauk, the Kickapoo texts collected by the late Dr. William Jones, subsequently correcting the version with a Kickapoo informant. The dialectic differences between Sauk, Fox, and Kickapoo are not great, and as few of the Mexican Kickapoo now speak any but broken English, a Sauk was employed in making the first draft of the translation.

Among the Shawnee of Oklahoma Dr. Michelson's work was primarily linguistic. The results confirmed his opinion, gathered from the late Dr. Gatschet's notes and texts, that the Shawnee language is most intimately connected with Sauk, Fox, and Kickapoo, on the one hand, and with the Abnaki dialects on the other. He also gathered some Shawnee myths, partly in texts, partly on the phonograph, and a beginning was made on the Shawnee social organization. It was found that, apparently, the larger divisions are not phratries, nor are their clans exogamous, as already noted by Dr. Gatschet, despite the ordinary view. The question of exogamy or endogamy among the Shawnee is fixed merely by blood relationship.

Among the Mexican Kickapoo Dr. Michelson gathered some additional texts, corrected the translations of Dr. Jones's Kickapoo texts, as above noted, made observations on Kickapoo clan organization, and gathered also linguistic data which shed further light on the relations of the Sauk, Fox, and Kickapoo dialects.

Dr. Michelson returned to Washington about the middle of December and commenced the elaboration of his field notes. In January he visited the Carlisle Industrial School, where he procured linguistic

data on Ottawa, Turtle Mountain Chippewa, Potawatomi, Abnaki, Menominee, Sauk, and Arapaho. The most important result obtained is the fact that the so-called Turtle Mountain Chippewa is really Cree—at least such is the language of the pupils at Carlisle. Whether the entire band is Cree is another question. Dr. Michelson's opinion that Arapaho is the most divergent Algonquian dialect was confirmed, and it was made more nearly certain that Menominee distinctly belongs with Cree, not with Chippewa. Dr. Michelson returned from Carlisle in the following month, when he was compelled to submit to an operation for trachoma, which apparently had been contracted during his field researches of the previous summer. On resuming his duties it was found advisable to incorporate the linguistic notes obtained in the summer and fall of 1911 and the winter of 1911-12, so far as practicable, in his memoir on the Linguistic Classification of the Algonquian Tribes, then in galley proof preparatory to publication in the twenty-eighth annual report. The value and completeness of this paper were thereby greatly enhanced.

While in the office Dr. Michelson was frequently called on to furnish data for answering letters of inquiry, and he also found opportunity to furnish notes of addenda and corrigenda for a future edition of the Handbook of American Indians.

Mr. J. N. B. Hewitt, ethnologist, was engaged throughout the year in office work, continuing the editing and copying of the legends, traditions, and myths of the Seneca, collected by the late Jeremiah Curtin in 1884-85. Of the original list of 120 items composing this manuscript collection, 85 have been edited and typewritten, exclusive of two items which were translated from inedited texts. While this work is now practically complete, the apparent discrepancy in the number of edited and typewritten items (about 35) is due to the fact that the original list contained a number of texts of little ethnological value, being merely narratives of local and personal adventures of modern Indians with ghosts, and the like, and tales about modern witchcraft. The two items completely translated were difficult of rendering, as they were partly illegible and had been left inedited. Two or three texts of similar character remained to be translated, and on these Mr. Hewitt was engaged at the close of the fiscal year. The Seneca material collected by Mr. Curtin and placed in condition for publication by Mr. Hewitt now comprises 1,350 pages.

In addition Mr. Hewitt undertook the work of translating a number of inedited and uncorrected manuscripts bearing on Seneca traditions and legendary lore recorded by himself in 1896. Thirteen of these items were translated, aggregating 410 pages.

As in the past, Mr. Hewitt devoted considerable time to collecting and preparing data for replies to correspondents on linguistic, historical, sociological, and technical subjects, and served also as custodian of manuscripts.

Mr. Francis La Flesche, ethnologist, was engaged during the year in the further study of the tribal rites of the Osage Indians in Oklahoma. These rites are regarded by the Osage as mysterious, and, being held in great awe by the tribe, are very difficult to obtain, even by their own members. Instances are pointed out where, in the belief of the Osage, persons in officiating at ceremonies made mistakes in the form or in the recitation of the rituals and in the singing of the songs, and have therefore become insane, or blind, or have met with violent death. The murder of Saucy Calf, a man of high standing in his tribe, and the burning of his house last winter are attributed by his people to the fact that he gave away certain rituals and songs of the sacred tribal ceremonies. From Saucy Calf Mr. La Flesche had obtained the entire first degree of the No^hoⁿzhiⁿga rites, and while the two were together the old seer frequently expressed the fear that some harm might come to him for parting with these religious secrets. By reason of the superstitious awe in which these sacred rites are held, Mr. La Flesche's studies in this particular have been necessarily slow, since it was essential for him first to gain the full confidence of those versed therein. Notwithstanding this difficulty, he has been fortunate enough to procure the full ritual of the Hibernating of the Black Bear, which pertains to the origin of the seven and six war honors of the tribe, and is recited by the men members of the No^hoⁿzhiⁿga of the Black Bear clan at the sacred-bundle ceremony when the warrior chosen recounts his war honors and takes up the seven and six willow saplings to count and the songs of this part of the ceremony are being sung by the officiating priest. A related ritual, which tells of the rearing of a child to the completion of its life, is recited when a widow is being initiated into the No^hoⁿzhiⁿga to take the place of her husband; but Mr. La Flesche has not yet been able to record this, owing to the dread inspired by the death of Saucy Calf. However, after considerable difficulty he succeeded in obtaining six rituals from Waxrizhi, whose father, who died about a year before, is said to have been the last of the No^hoⁿzhiⁿga men thoroughly versed in the ancient rites.

Another ritual obtained is the Dream Ritual, with literal and free translations. This is a narration of a No^hoⁿzhiⁿga's fast dream of the sacred packs, a number of which have been procured and transferred to the National Museum.

Still another ritual, known as the Wi-gi-e Paho-gre, "First of the Rituals," with literal and free translations, was recorded. This tells of the coming of the Hoⁿga of the Seven Fireplaces, or clans, to the earth from the sky by permission of the Sun, Moon, and Morning and Evening stars, and with the aid of the Winged Hoⁿga, or "Spotted Eagle"; of their finding the earth covered with water when they descended; their having to rest on the tops of seven red-oak trees, until, by his magic power, the Elk dispersed the waters

and made dry land appear; their meeting with the crawfish, which brought from out of the earth clays of different colors to be used by the people of the Ho^oga clan for symbolic purposes in their No^oho^ozhi^oga rites. The No^oho^ozhi^oga are said to be exceedingly careful not to recite this ritual to anyone unless given large fees.

The ritual of the Birth of the Sacred Bird, also recorded and translated by Mr. La Flesche, relates to the adoption of the hawk as a war symbol and is in the form of a legend telling of the birth of the bird, as of a human being, to the sister of four brothers who attended the delivery of the child. The story begins with the birth, gives the details of each stage of growth, and tells of the prediction of the four brothers that their nephew was destined to become a great warrior. The child becomes fretful and wails ceaselessly until the skins of seven prey animals and a bow with a bit of scalp attached are brought to it by its uncles. For this reason no one can be initiated into the order of the No^oho^ozhi^oga unless he furnishes the skins of these seven animals.

The ritual of the Symbolic Painting was likewise recorded. This relates to the symbolic painting of the man who acts as the initiator in the initiation of a new member of the No^oho^ozhi^oga order. The paint is symbolic of the dawn and the rising sun.

Another ritual, that of the Approach to the House of Initiation, is recited by the officiating priest while he, the initiator, and the votary ceremonially approach the place of meeting of the No^oho^ozhi^oga for performing some of the ceremonies. It relates to the Tsi'-wa-ko-da-gi, or "mysterious house," of the Ho^oga clan.

The ritual of Feeding of the Fire relates to the ceremonial building of the sacred fire at the place of gathering of the No^oho^ozhi^oga to perform one of the ceremonies. It is an appeal to the supernatural for aid in obtaining deer for the sustenance of life and also for help to overcome the tribes which menace the lives, the peace, and the happiness of the people.

While these rituals are in themselves complete, each one forms a part of the great No^oho^ozhi^oga rite, which Mr. La Flesche is endeavoring to record in its entirety.

Aside from the rituals and songs, Mr. La Flesche has procured stories of the *wako'dagi*, or medicine men, and of the strange animals from which they obtained supernatural powers; he has also recorded love stories, stories of those who had died and returned to life, war stories, and myths. Some of these have been transcribed in final form. In all, the text of these stories aggregates about 250 pages. Mr. La Flesche, however, has given comparatively little attention to legends and stories of this kind, having devoted his energies chiefly to the secret rites that at one time meant so much to the Osage people, and which are so rapidly disappearing.

By agreement with Mr. Karl Moon, noted for his work in Indian photography, the bureau is to receive a series of Osage photographs, taken with the aid of Mr. La Flesche, who made the necessary arrangements with the Indians to pose for them. Mr. La Flesche received as a gift from Wano^sshezhi^{ga} the sacred bundle of the Eagle clan, to which he belongs. This fine specimen has been transferred to the National Museum, where it is placed with the other Osage bundles that he has been so fortunate as to obtain.

Dr. Paul Radin, ethnologist, was among the Winnebago Indians of Wisconsin at the opening of the fiscal year, having resumed his investigations of this people in the preceding month. These were continued to completion, and in October, 1911, Dr. Radin returned to Washington and continued the preparation of a monograph on the ethnology of the Winnebago tribe, which was brought to completion and submitted in the latter part of March, 1912. Although the medium of publication of this memoir has not yet been determined, it is probable that it will appear as the accompanying paper of the twenty-ninth annual report.

Dr. Franz Boas, honorary philologist, continued the linguistic researches outlined in previous reports, the immediate object of which is the completion of part 2 of the Handbook of American Indian Languages, which is to contain sketches of the native languages of Oregon and Washington, with some additional material on the extreme northwestern part of the continent. An account of the development of the plan and object of this Handbook was set forth in my last annual report.

The printing of the sketch of the Takelma grammar, by Dr. Edward Sapir, for this Handbook, has been completed, and the separates thereof have been issued. The work of Dr. Leo J. Frachtenberg unfortunately suffered delay owing to protracted illness. His revision of the Coos grammar, however, has been almost completed, and it is expected that the manuscript of the Siuslaw grammar will be in the hands of Dr. Boas, as editor of the Handbook, by August of this year. The necessary final revision of the subject matter of both sketches was made by Dr. Frachtenberg at Siletz, Oregon.

Dr. Boas rewrote a grammar of the Chukchee language, with comparative notes on the Koryak and Kamchadal, by Mr. Waldemar Bogoras, and added references to the published Russian and English series of Chukchee texts, which had been published previously by Mr. Bogoras. In the course of the year this manuscript was also typewritten and prepared for the printer. In the summer of 1912 Dr. Boas met Mr. Bogoras in Berlin and discussed with him the revised form of the grammar. At the close of the year the results of these discussions were being incorporated in the grammar, and it is expected that the manuscript will be ready for the printer early in the autumn.

Dr. Boas has followed out the policy of printing texts illustrating the grammatical sketches in a series which according to the original plan were to have been published as bulletins of the bureau, but this plan was abandoned for administrative reasons. During the present year the series of Tsimshian texts, illustrating the Tsimshian dialect, was published as Volume III of the Publications of the American Ethnological Society, and the series of Maidu texts as Volume IV of the same series. These illustrate languages contained in part 1 of the Handbook, so that now texts for all the languages therein treated are available to students.

The printing of the Coos texts, by Dr. Frachtenberg, which are to appear as Volume I of the Columbia University Contributions to Anthropology, has almost been completed, and the printed matter has been utilized to illustrate the sketch of the language.

The research in Indian music by Miss Frances Densmore was characterized by the completion of her studies among the Chippewa and the beginning of investigations along similar lines among the Sioux. Miss Densmore's field work comprised one month with the Sioux on the Sisseton Reservation in South Dakota, about two months on Standing Rock Reservation in North Dakota, and a few days on the White Earth Reservation in Minnesota for the final revision of some descriptions and translations in her Chippewa manuscripts. The finished results submitted during the year comprised material on both Chippewa and Sioux music. Two papers on Chippewa studies were presented, one entitled "Further Analyses of Chippewa Songs," the other bearing the title "Deductions from the Analysis of Chippewa Music." In addition Miss Densmore finished about 100 pages that included additional references to the bibliography of the subject, a more complete explanation of minor points, some linguistic analyses, and slight changes in the analysis of individual songs to conform with present methods—all this was complete for publication when submitted. Her paper on "The Sun Dance of the Teton Sioux," including 33 songs, could be published in its present form, but it is deemed desirable to add a structural analysis of the songs similar to that accompanying the Chippewa material.

Additional illustrations for the Chippewa studies have been submitted during the year, also adequate illustrations for the paper on the Sun dance of the Sioux. With few exceptions these illustrations are photographs taken especially for the work, many being pictures of old ceremonial articles used in the Sun dance. Considerable attention also has been given to the collecting of specimens having an interest in connection with the work.

Mr. W. H. Holmes, head curator of the department of anthropology of the United States National Museum, has continued, as opportunity afforded, the preparation of the Handbook of Archeology

commenced by him while chief of the bureau. The main body of the research work in connection with this Handbook has been completed, but much remains in the way of literary investigation and in the preparation of illustrations. While no time can yet be fixed for the completion of the work, Mr. Holmes hopes to finish the manuscript and the illustrations for the first volume before the summer of 1913.

Good progress has been made in transcribing the manuscript French-Miami dictionary, by an unknown author but attributed to Père Joseph Ignatius Le Boulanger, in the John Carter Brown Library at Providence, Rhode Island. The copying has been made possible through the courtesy of Mr. George Parker Winship, librarian, who not only has placed this valuable manuscript at the disposal of the bureau for this purpose, but has kindly permitted his assistant, Miss Margaret Bingham Stillwell, to prepare the transcript, and personally has supervised the making of photostat copies of part of the manuscript, especially that devoted to the text portion. During the year Miss Stillwell finished and submitted the transcript of 295 pages, representing pages 20 to 77 of the original.

Prof. Howard M. Ballou, of the College of Hawaii, has continued the search for titles for the proposed List of Works Relating to Hawaii, especially those of works published locally in the native language, many of which are very rare. In this work Prof. Ballou has had the generous assistance of the Rev. Mr. Westervelt. This bibliography has now reached a stage where steps should soon be taken toward finally arranging the material for publication.

There has long been need of a revision of the Catalogue of Pre-historic Works East of the Rocky Mountains, prepared by the late Dr. Cyrus Thomas and published as a bulletin of the bureau in 1891, but which passed out of print several years ago. In the fall of 1911 steps were taken toward undertaking this revision, and the bureau was fortunate at the outset in engaging the services of Mr. D. I. Bushnell, jr., of University, Virginia, as compiler of the work. Circular letters were dispatched to county clerks east of the Mississippi, who not only supplied direct information respecting aboriginal sites, but furnished the names of hundreds of collectors and others having personal knowledge of the subject, and to these special letters were addressed. By this means so much information of a local character was received in regard to the location of mounds, village and camp sites, shell heaps, quarries and workshops, pictographs, etc., in addition to that recorded in the Catalogue of Dr. Thomas, that the revised work gives promise of being a fairly complete Handbook of Aboriginal Remains East of the Mississippi. Besides finishing the collation of this material and of other data already in possession of the bureau, Mr. Bushnell has made good progress in extracting the information contained in various publications devoted to American archeology,

notably those by Mr. Clarence B. Moore on the mounds of the South. In this compilation the bureau has had the generous cooperation of Mr. Arthur C. Parker, State archeologist of New York, and of Mr. Warren K. Moorehead, curator of the department of archeology of Phillips Academy, Andover, Massachusetts, while others have kindly offered their aid. No date for the publication can yet be given.

PUBLICATIONS.

The editorial work of the bureau has been conducted under the immediate charge of Mr. J. G. Gurley, editor. The proof reading of the twenty-seventh annual report, the accompanying paper of which is a monograph entitled "The Omaha Tribe," by Alice C. Fletcher and Francis La Flesche, was completed and the report published.

The manuscript of the twenty-eighth annual report was edited and transmitted to the Public Printer. At the close of the year about one-third of this report was in page form, and the remainder was in process of paging. This report includes the following papers: Casa Grande, Arizona, by Dr. J. Walter Fewkes; Antiquities of the Upper Verde River and Walnut Creek Valley, Arizona, also by Dr. Fewkes, and Preliminary Report on the Linguistic Classification of Algonquian Tribes, by Dr. Truman Michelson.

The series of bulletins was increased by the addition of Bulletin 47, A Dictionary of the Biloxi and Ofo Languages, Accompanied by Thirty-one Biloxi Texts and Numerous Biloxi Phrases, by James Owen Dorsey and John R. Swanton.

Bulletin 49, List of Publications of the Bureau, was issued in a third impression.

Bulletin 40, Handbook of American Indian Languages, Part 2, was carried toward completion under the editorship of Dr. Franz Boas, as elsewhere stated, with the result that two sections, comprising 418 pages, dealing with the Takelma and Coos languages, are in substantially final form.

Toward the close of the year steps were taken to advance the work on Bulletin 46, Byington's Choctaw Dictionary, edited by Dr. John R. Swanton.

Considerable time was given to the editing and proof reading of Bulletin 52, Early Man in South America, by Aleš Hrdlička, in collaboration with W. H. Holmes, Bailey Willis, Fred. Eugene Wright, and Clarence N. Fenner. At the close of June the work was nearly through press.

The last bulletin to receive attention was No. 53—Chippewa Music—II, by Frances Densmore. Substantial progress on the preparation of the author's material for the press had been made at the close of the fiscal year.

The demand for the publications of the bureau continues to increase, and their distribution, numbering 15,003 copies during the year, necessitated extended correspondence. The distribution of the bureau publications has been under the immediate care of Miss Helen Munroe and Mr. E. L. Springer, of the Smithsonian Institution.

A concurrent resolution authorizing the reprinting of the Handbook of American Indians was introduced in the Senate and passed on May 11, 1912, and subsequently was favorably reported by the Committee on Printing of the House of Representatives, but it had not been passed at the close of the fiscal year.

ILLUSTRATIONS.

The preparation of the illustrations for the publications of the bureau and the photographing of the members of visiting delegations of Indians were conducted under the charge of Mr. De Lancey Gill, illustrator. In connection with this work 90 photographic negatives of Indians and 123 of ethnologic subjects were prepared; 196 films exposed by members of the bureau in the field were developed; 1,322 prints were made for publication and for exchange or distribution; and 110 pen and brush drawings were prepared. At the request of Mr. Wilberforce Eames, of the New York Public Library, a collection of 118 photographs of representative Indians, covering 55 tribes, was furnished by the bureau as a part of a loan exhibition opened at that library in May and was still on view at the close of the fiscal year.

Mr. Gill had the usual assistance of Henry Walther until February 16, 1912, when his services in behalf of the bureau for many years came to a close with his death. Mr. Walther has been succeeded by Walter A. Stenhouse.

LIBRARY.

Under the supervision of Miss Ella Leary the work of the library has made satisfactory progress. During the year 720 volumes (103 by purchase) and 300 pamphlets were received; in addition 620 periodical publications, of which 606 were acquired by exchange and the remainder by subscription, were accessioned. The recataloging of certain serial publications in the library has been continued, and attention given to the preparation of a subject catalogue of the large collection of pamphlets, many of which had been stored and therefore were inaccessible for three or four years. Successful effort has been made to complete the sets of certain publications of scientific societies and other learned institutions. For the use of the members of the staff the librarian has prepared and posted copies of a monthly bulletin of the library's principal accessions; and in order that the

large number of scientific serials received might also be made readily accessible, the current issues have been displayed on a table provided for that purpose.

Notwithstanding the increasing value of the bureau's library, it was found necessary, from time to time, to make requisition on the Library of Congress for the loan of books, the volumes thus received for temporary use numbering about 250. The volumes bound during the year numbered 492. At the close of the year the library contained approximately 17,970 volumes, about 12,500 pamphlets, and several thousand periodicals. Although maintained primarily as a reference library for the bureau's staff, it is constantly consulted by students not connected with the Smithsonian Institution and by officials of the executive departments and the Library of Congress.

COLLECTIONS.

The following collections were made by members of the staff of the bureau during their field researches:

By Mr. F. W. Hodge: Twenty-two paper squeezes of early and recent Spanish inscriptions on El Morro, or Inscription Rock, in New Mexico. Objects of stone, bone, clay, etc., from the cemetery of the ancient ruined pueblo of Kwasteyukwa on the mesa above the Jemez Hot Springs, New Mexico. Ten barrels of pottery and human skeletal remains from the same locality. These collections were made under a joint expedition conducted by the bureau and the School of American Archæology.

By Dr. John R. Swanton: Two ball sticks, one ball, one breech-cloth and belt, one tiger tail, from the Creek Indians at Coweta, Oklahoma.

By Mr. James Mooney: Four dance masks, two pairs of ball sticks, two toy baskets, two wooden spoons, one ox muzzle, one stone ax, one small celt, three arrowheads, from the Cherokee Indians of North Carolina.

By Mr. Francis La Flesche: Two sacred packs of the Osage Indians.

PROPERTY.

The most valuable part of the property of the bureau consists of its library, manuscripts (chiefly linguistic), and photographic negatives. The bureau possesses also cameras, photographic machines, and other ordinary apparatus and equipment for field work; stationery and office supplies; necessary office furniture; typewriters, etc., and the undistributed stock of its publications. The amount of \$342.27 was expended for office furniture during the year, while the cost of necessary books and periodicals was \$396.42.

As in the past, the manuscripts have been under the custodianship of Mr. J. N. B. Hewitt. Those withdrawn by collaborators of the bureau during the year numbered 234 items. The new manuscripts acquired are those hitherto mentioned in this report as having been prepared by members of the staff or by collaborators and designed for eventual publication. Negotiations have been entered into with the heirs of the late Señor Andomaro Molina, of Merida, Yucatan, for the return of Henderson's Maya Dictionary, a manuscript of six volumes lent to Señor Molina a number of years ago for use in connection with certain linguistic studies then contemplated in behalf of the bureau.

RECOMMENDATIONS.

I desire to repeat the recommendations submitted in my last annual report, respecting the extension of the researches of the bureau and for other purposes, and urging the appropriation of the necessary funds for conducting them. These include the following projects:

The exploration and preservation of antiquities in the arid region.

The extension of ethnologic researches in Alaska and among the tribes of the Mississippi Valley.

The preparation of a completely revised edition of the Handbook of American Indians.

Additional editorial assistance in preparing the publications of the bureau for the press.

A small sum to meet the expense of supplying photographs of Indian subjects to schools and colleges, and for other educational purposes, and for systematically making photographs in the field to illustrate the daily life and the ceremonies of the Indians.

In addition it is recommended that the systematic excavation and study of certain archeological sites in the South and West be conducted in order that archeological research may go hand in hand with the ethnological studies now being pursued in the same fields.

The reasons for extending the work of the bureau in the directions indicated are set forth more fully in the estimates of appropriations for the year 1914, in connection with which the sums regarded as necessary to the work are given.

Respectfully submitted.

F. W. HODGE,
Ethnologist in Charge.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1912:

The congressional appropriation for the support of the service during the year, including the allotment for printing and binding, was \$32,200 (the same amount as granted for the past four years), and the repayments for services rendered were \$4,391.02, making the total available resources for carrying on the system of international exchanges \$36,591.02.

The total number of packages handled during the year was 315,492—an increase over the number for the preceding year of 29,794. The weight of these packages was 568,712 pounds—a gain of 7,904 pounds. The increase in the volume of business, which has been continuous since the establishment of the service, is shown in the diagram on page 59.

The publications dispatched by the Exchange Service are classified under four heads: First, the Congressional Record; second, "Parliamentary documents"; third, "Departmental documents"; fourth, "Miscellaneous scientific and literary publications."

The term "Parliamentary documents," as here used, refers to publications set aside by law for exchange with foreign Governments, and includes not only copies of documents printed by order of either House of Congress, but copies of each publication issued by any department, bureau, commission, or officer of the Government. The object in sending these publications abroad is to procure for the use of the Congress of the United States a complete series of the publications of other Governments, and the returns are deposited in the Congressional Library.

The term "Departmental documents" embraces all the publications delivered at the Institution by the various Government departments, bureaus, or commissions, for distribution to their correspondents abroad from whom they desire to obtain similar publications in exchange. The publications received in return are deposited in the various departmental libraries.

The "Miscellaneous scientific and literary publications" are received chiefly from learned societies, universities, colleges, scientific

institutes, and museums in the United States, and transmitted to similar institutions in all parts of the world.

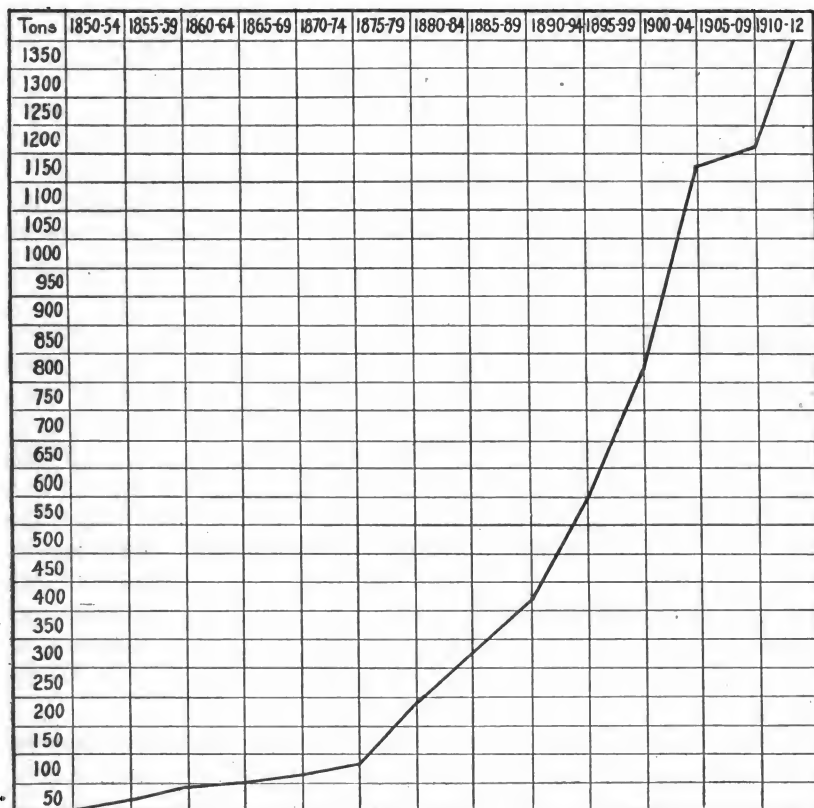


Diagram showing increase of exchange transmissions, in tons of 2,000 pounds, from 1850 to 1912, divided into periods of five years each.

For purposes of comparison, the number and weight of packages of different classes are indicated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad	136,722	.....	128,253	.....
Publications received in return for parliamentary documents.....		2,425		17,794
United States departmental documents sent abroad	72,438	.....	180,990	.....
Publications received in return for departmental documents.....		9,452		19,113
Miscellaneous, scientific, and literary publications sent abroad..	56,110	.....	113,593	.....
Miscellaneous, scientific, and literary publications received from abroad for distribution in the United States		38,345		108,969
Total.....	265,270	50,222	422,836	145,876
Grand total.....	315,492		568,712	

The disparity indicated by the foregoing statistics between the number of packages sent and those received in behalf of the Government is accounted for, in part, by the fact that packages sent abroad contain, as a rule, only one publication, while those received in return often comprise many volumes, in some instances, especially in the case of publications received in return for parliamentary documents, the term "package" being applied to large boxes containing 100 or more separate publications, of which no lists are made in Washington, as the boxes are forwarded to their destinations unopened. Furthermore, many returns for publications sent abroad reach their destinations direct by mail and not through the Exchange Service.

Proper allowance being made for these circumstances, it is, nevertheless, apparently true that the publications of the United States Government sent to foreign countries greatly exceed in number those received by the Library of Congress and the several executive departments, bureaus, and independent offices. This in turn appears to be due mainly to the fact that most foreign Governments publish less extensively on scientific and other subjects than our own. The fiscal relations between the Government and scientific and other institutions are more complex in many countries than is the case in the United States, and the distinction between public documents and other publications is not so clear, especially where the printing for the Government is not centralized in one office or is not done by the Government itself.

While several of the departments and bureaus of our own Government have expressed themselves satisfied with the returns received through the Exchange Service, it is proposed to make a further investigation of this subject for the purpose of ascertaining whether some important publications and series of publications have not been overlooked, and also what proportion the number of the publications issued by certain European Governments in a given year bears to the number received by the departments and bureaus of the United States Government, and to the number sent to the former. It will be obvious that a debit and credit account is out of the question in a case of this kind. While a scientific or literary institution issues publications for the benefit of the whole world, a Government issues reports and other documents mainly for purposes of record and for the information of its own officers and its own citizens. The more largely the people are directly concerned in the Government, and the more extended its interests and activities, the greater will be the output of reports and other publications. Such a Government will have much more to offer than it can expect to receive in return from a smaller country.

As regards the exchange of miscellaneous scientific and literary publications, it will be noted that the weight in pounds of those

received into the United States through the Exchange Service during the fiscal year 1911 more than doubled the weight of those sent abroad, while the weight of those received during the fiscal year 1912, covered by this report, almost equalled that of those sent abroad. There is every reason, therefore, to believe that this important branch of the work yields adequate returns.

By referring to the foregoing table it will be noted that 70 per cent of the work of the office has been conducted in behalf of United States governmental establishments.

Of the 2,395 boxes used in forwarding exchanges to foreign bureaus and agencies for distribution (an increase of 15 boxes over 1911), 328 boxes contained full sets of United States official documents for authorized depositories and 2,067 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents. The number of boxes sent to each foreign country and the dates of transmission are shown in the following table:

Consignments of exchanges to foreign countries.

Country.	Number of boxes.	Date of transmission.
Argentina.....	36	July 15, Aug. 16, Sept. 20, Oct. 18, Nov. 23, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 23, June 22, 1912.
Austria.....	83	July 12, Aug. 3, Sept. 7, Oct. 6, Nov. 14, Dec. 6, 1911; Jan. 10, Feb. 7, Mar. 6, Apr. 3, May 8, June 5, 1912.
Barbados.....	2	Mar. 27, June 27, 1912.
Belgium.....	62	July 8, 29, Aug. 12, 29, Sept. 23, Oct. 14, Nov. 4, 25, Dec. 16, 1911; Jan. 6, 27, Feb. 17, Mar. 16, 30, Apr. 27, May 18, June 8, 1912.
Bermuda.....	1	Feb. 15, 1912.
Bolivia.....	12	Aug. 29, Sept. 28, Nov. 13, 1911; Jan. 30, Feb. 24, Mar. 22, May 23, June 22, 1912.
Brazil.....	31	July 15, Aug. 16, Sept. 20, Oct. 18, Nov. 25, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 23, June 22, 1912.
British Colonies.....	12	July 3, Aug. 12, 21, Sept. 2, Oct. 30, Nov. 4, 1911; Jan. 6, 20, 27, Apr. 27, June 8, 1912.
British Guiana.....	2	Jan. 30, June 29, 1912.
British Honduras.....	1	Jan. 30, 1912.
Bulgaria.....	3	July 28, Sept. 29, Nov. 7, 1911.
Canada.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Cape Colony.....	12	Aug. 5, Nov. 7, 1911; Jan. 25, Apr. 15, May 31, June 27, 1912.
Chile.....	22	July 15, Aug. 16, Sept. 20, Oct. 18, Nov. 23, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 24, June 22, 1912.
China.....	23	July 21, Aug. 26, Sept. 29, Nov. 4, Dec. 29, 1911; Jan. 31, Feb. 28, Mar. 27, Apr. 30, May 31, June 27, 1912.
Colombia.....	14	Aug. 21, Sept. 28, Nov. 23, 1911; Jan. 20, Feb. 20, Apr. 22, May 23, 1912.
Costa Rica.....	17	July 27, Aug. 21, Sept. 28, Oct. 27, Nov. 23, 1911; Jan. 20, Feb. 24, Apr. 22, May 23, June 22, 1912.
Cuba.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Denmark.....	31	July 19, Aug. 24, Sept. 27, Oct. 19, Nov. 16, Dec. 19, 1911; Jan. 20, Feb. 20, Mar. 15, Apr. 15, May 20, June 20, 1912.
Ecuador.....	7	Aug. 29, Sept. 28, Nov. 13, 1911; Jan. 30, Feb. 24, Apr. 30, June 22, 1912.

Consignments of exchanges to foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
Egypt.....	13	July 22, Aug. 25, Sept. 26, Oct. 28, Nov. 25, 1911; Jan. 13, Feb. 3, Mar. 9, Apr. 6, May 4, June 8, 1912.
France.....	207	July 6, 26, Aug. 10, 24, Sept. 15, 28, Oct. 12, Nov. 1, 23, Dec. 8, 21, 1911; Jan. 4, 25, Feb. 8, 29, Mar. 14, 28, Apr. 4, 25, May 9, June 6, 27, 1912.
Germany.....	410	July 6, 11, 18, 25, Aug. 1, 8, 15, 22, 29, Sept. 2, 12, 19, 26, Oct. 3, 10, 17, 31, Nov. 7, 14, 21, 28, Dec. 5, 12, 19, 1911; Jan. 3, 9, 16, 23, 30, Feb. 6, 13, 20, 27, Mar. 5, 12, 19, 26, Apr. 2, 9, 16, 23, 30, May 7, 15, 21, 28, June 4, 11, 18, 25, 1912.
Great Britain and Ireland.	423	July 3, 8, 15, 22, 29, Aug. 5, 12, 19, 26, Sept. 2, 11, 18, 23, 30, Oct. 7, 14, 23, 30, Nov. 4, 11, 18, 25, Dec. 2, 9, 16, 27, 1911; Jan. 6, 13, 20, 27, Feb. 3, 10, 17, 24, Mar. 2, 9, 16, 23, 30, Apr. 6, 13, 20, 27, May 4, 11, 18, 25, June 1, 8, 15, 22, 29, 1912.
Greece.....	19	July 28, Aug. 29, Sept. 27, Nov. 7, Dec. 28, 1911; Jan. 25, Feb. 26, Mar. 27, Apr. 25, May 25, June 27, 1912.
Guatemala.....	8	July 27, Aug. 29, Sept. 28, Nov. 13, 1911; Jan. 30, Feb. 24, Apr. 30, June 22, 1912.
Haiti.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Honduras.....	7	July 27, Sept. 28, Nov. 13, 1911; Jan. 30, Feb. 24, Apr. 30, June 22, 1912.
Hungary.....	39	July 12, Aug. 3, Sept. 7, Oct. 6, Nov. 14, Dec. 6, 1911; Jan. 10, Feb. 7, Mar. 6, Apr. 3, May 8, June 5, 1912.
India.....	38	July 3, 29, Aug. 5, 12, Sept. 2, 18, 23, Oct. 14, 23, 30, Nov. 4, 18, 25, 1911; Jan. 6, 20, 30, Feb. 17, 24, Mar. 9, 16, 23, 30, Apr. 13, 27, May 4, 18, June 8, 15, 22, 1912.
Italy.....	96	July 24, Aug. 5, Sept. 2, 25, Oct. 16, Nov. 11, 25, 1911; Jan. 13, Feb. 3, Mar. 9, Apr. 6, May 4, 18, June 8, 29, 1912.
Jamaica.....	8	July 27, Aug. 31, Sept. 29, Nov. 29, 1911; Jan. 30, Feb. 26, Apr. 30, June 27, 1912.
Japan.....	62	July 21, Aug. 26, Sept. 27, Oct. 20, Nov. 20, Dec. 28, 1911; Jan. 23, Feb. 21, Mar. 20, Apr. 20, May 20, June 20, 1912.
Korea.....	4	Sept. 29, 1911; Feb. 26, Mar. 27, June 27, 1912.
Liberia.....	5	July 27, Sept. 29, Nov. 13, 1911; Feb. 26, June 27, 1912.
Lourenco Marquez.....	2	Nov. 13, 1911; June 22, 1912.
Manitoba.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Mexico.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Montenegro.....	3	Nov. 13, 1911; Feb. 24, June 22, 1912.
Natal.....	2	Sept. 2, 1911; Feb. 24, 1912.
Netherlands.....	60	July 11, 29, Aug. 29, Sept. 19, Oct. 17, Nov. 14, 28, Dec. 12, 1911; Jan. 9, 30, Feb. 27, Mar. 12, 26, Apr. 9, 23, May 7, June 4, 25, 1912.
Newfoundland.....	2	Jan. 16, Apr. 11, 1912.
New South Wales.....	33	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 24, Feb. 15, Mar. 20, Apr. 20, May 20, June 20, 1912.
New Zealand.....	28	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 24, Feb. 15, Mar. 20, Apr. 20, May 20, June 20, 1912.
Nicaragua.....	5	Aug. 29, Sept. 28, 1911; Jan. 30, Feb. 24, June 22, 1912.
Norway.....	28	July 19, Aug. 24, Sept. 27, Oct. 19, Nov. 16, Dec. 19, 1911; Jan. 20, Feb. 20, Mar. 15, Apr. 15, May 20, June 20, 1912.
Ontario.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Panama.....	3	Nov. 13, 1911; Feb. 24, June 22, 1912.
Palestine.....	4	Aug. 31, Nov. 29, 1911; June 27, 1912.
Peru.....	18	July 15, Aug. 16, Sept. 20, Oct. 18, Nov. 23, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 23, June 22, 1912.
Portugal.....	19	July 19, Aug. 24, Sept. 27, Oct. 19, Nov. 16, Dec. 19, 1911; Jan. 20, Feb. 20, Mar. 15, Apr. 16, May 20, June 20, 1912.
Quebec.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.

Consignments of exchanges to foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
Queensland.....	21	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 28, Feb. 15, Mar. 20, Apr. 20, May 20, June 20, 1912.
Roumania.....	10	July 28, Sept. 29, Nov. 7, 1911; Apr. 10, May 31, June 27, 1912.
Russia.....	81	July 13, Aug. 4, Sept. 7, Oct. 6, Nov. 11, Dec. 7, 1911; Jan. 11, Feb. 8, Mar. 7, Apr. 4, May 9, 29, 1912.
Salvador.....	7	Aug. 29, Sept. 28, Nov. 29, 1911; Jan. 30, Feb. 24, Apr. 30, June 22, 1912.
Santo Domingo.....	1	Sept. 29, 1911.
Servia.....	12	Aug. 29, Nov. 7, 1911; Jan. 24, May 7, June 27, 1912.
Siam.....	10	July 28, Oct. 10, Nov. 4, Dec. 29, 1911; Jan. 31, Feb. 26, Mar. 28, Apr. 30, May 31, June 29, 1912.
South Australia.....	19	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 24, Feb. 15, Mar. 20, Apr. 20, May 20, June 20, 1912.
Spain.....	30	July 22, Aug. 25, Sept. 26, Oct. 28, Nov. 25, 1911; Jan. 13, Feb. 3, Mar. 9, Apr. 6, May 4, June 8, 29, 1912.
Sweden.....	54	July 13, Aug. 4, Sept. 7, Oct. 6, Nov. 11, Dec. 7, 1911; Jan. 11, Feb. 8, Mar. 7, Apr. 4, May 6, June 6, 1912.
Switzerland.....	53	July 8, 29, Aug. 10, 29, Sept. 23, Oct. 14, Nov. 4, 25, Dec. 16, 1911; Jan. 6, 27, Feb. 16, Mar. 16, 30, Apr. 27, May 18, June 8, 1912.
Syria.....	4	Nov. 2, 1911; Feb. 5, 1912.
Tasmania.....	10	Oct. 30, Nov. 4, 1911; Jan. 6, Apr. 27, 1912.
Transvaal.....	19	July 27, Aug. 29, Sept. 28, Nov. 7, 1911; Jan. 25, Feb. 24, Mar. 27, Apr. 26, May 22, June 22, 1912.
Trinidad.....	4	Aug. 31, 1911; Jan. 30, Mar. 27, June 27, 1912.
Turkey.....	15	Aug. 30, Nov. 2, 1911; Jan. 31, Feb. 28, Mar. 28, Apr. 30, May 31, 1912.
Uruguay.....	19	July 15, Aug. 21, Sept. 20, Oct. 27, Nov. 23, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 23, June 22, 1912.
Venezuela.....	14	Aug. 21, Sept. 28, Nov. 23, 1911; Jan. 20, Feb. 20, Apr. 22, May 23, June 23, 1912.
Victoria.....	33	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 24, Feb. 17, Mar. 20, Apr. 20, May 20, June 20, 1912.
Western Australia.....	20	July 22, 29, Aug. 5, 26, Sept. 2, 23, Oct. 7, 23, 30, Dec. 16, 1911; Jan. 6, 27, Mar. 16, Apr. 27, May 18, 1912.

For some years the Institution has been sending full sets of governmental documents to Cape Colony and the Transvaal and partial sets to Natal and the Orange River Colony. In May, 1912, a communication was received from the Secretary for the Interior of the Union of South Africa stating that since these Governments have now become Provinces of the Union, only one set of the publications would in future be required. In accordance with this request, the forwarding of official documents to the above-mentioned Provinces was discontinued, and one full series, beginning with box 133, is now transmitted to the Union of South Africa, addressed to the Secretary for the Interior, care of the Government Printer, Pretoria.

Packages containing scientific and literary publications received from individuals and establishments in the United States for transmission through the Exchange Service to miscellaneous addresses in the various Provinces of the Union of South Africa are now for-

warded to certain governmental establishments in those Provinces for distribution. The department of the interior of that country has been asked to undertake the distribution and also to forward to the United States such books as may be sent in return—the department acting in the same capacity for the Union of South Africa as this Exchange Service does for the United States.

Through the wrecking of the steamship *Papanui*, the Institution lost cases 117 and 158, containing exchanges for distribution in Western Australia by the Public Library at Perth. A number of packages sent in care of the director general of stores, India Office, London, were also lost at sea during the year, owing to the stranding of the steamer by which they were being transmitted to India. It is gratifying to state that the Institution has succeeded in procuring from the senders copies of most of the lost publications, which have been duly transmitted to their various destinations.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

The number of sets of United States official publications regularly forwarded to foreign countries in accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901, has been reduced from 89 to 86—one set instead of four now being forwarded to the Union of South Africa, to which reference is made above. This reduction in the number of sets transmitted abroad will be only temporary, as negotiations are now under way looking to the establishment of new exchanges.

The recipients of the 54 full and 32 partial sets are as follows:

DEPOSITORIES OF FULL SETS.

- Argentina: Ministerio de Relaciones Exteriores, Buenos Aires.
- Argentina: Biblioteca de la Universidad Nacional de La Plata.
- Australia: Library of the Commonwealth Parliament, Melbourne.
- Austria: K. K. Statistische Central-Commission, Vienna.
- Baden: Universitäts-Bibliothek, Freiburg.
- Bavaria: Königliche Hof- und Staats-Bibliothek, Munich.
- Belgium: Bibliothèque Royale, Brussels.
- Brazil: Bibliotheca Nacional, Rio de Janeiro.
- Canada: Parliamentary Library, Ottawa.
- Chile: Biblioteca del Congreso Nacional, Santiago.
- China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
- Colombia: Biblioteca Nacional, Bogota.
- Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
- Cuba: Secretaría de Estado (Asuntos Generales y Canje Internacional), Habana.
- Denmark: Kongelige Bibliothek, Copenhagen.

England: British Museum, London.
 England: London School of Economics and Political Science, London.
 France: Bibliothèque Nationale, Paris.
 France: Préfecture de la Seine, Paris.
 Germany: Deutsche Reichstags-Bibliothek, Berlin.
 Greece: Bibliothèque Nationale, Athens.
 Haiti: Secrétairerie d'État des Relations Extérieures, Port au Prince.
 Hungary: Hungarian House of Delegates, Budapest.
 India: Department of Education (Books), Government of India, Calcutta.
 Ireland: National Library of Ireland, Dublin.
 Italy: Biblioteca Nazionale Vittorio Emanuele, Rome.
 Japan: Imperial Library of Japan, Tokyo.
 Manitoba: Provincial Library, Winnipeg.
 Mexico: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
 Netherlands: Library of the States General, The Hague.
 New South Wales: Board for International Exchanges, Sydney.
 New Zealand: General Assembly Library, Wellington.
 Norway: Storthingets Bibliothek, Christiania.
 Ontario: Legislative Library, Toronto.
 Peru: Biblioteca Nacional, Lima.
 Portugal: Bibliotheca Nacional, Lisbon.
 Prussia: Königliche Bibliothek, Berlin.
 Quebec: Legislative Library, Quebec.
 Queensland: Parliamentary Library, Brisbane.
 Russia: Imperial Public Library, St. Petersburg.
 Saxony: Königliche Oeffentliche Bibliothek, Dresden.
 Servia: Section Administrative du Ministère des Affaires Etrangères, Belgrade.
 South Australia: Parliamentary Library, Adelaide.
 Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
 Sweden: Kungliga Biblioteket, Stockholm.
 Switzerland: Bibliothèque Fédérale, Berne.
 Tasmania: Parliamentary Library, Hobart.
 Turkey: Department of Public Instruction, Constantinople.
 Union of South Africa: Department of the Interior, Pretoria, Transvaal.
 Uruguay: Oficina de Canje Internacional de Publicaciones, Montevideo.
 Venezuela: Biblioteca Nacional, Carácas.
 Victoria: Public Library, Melbourne.
 Western Australia: Public Library of Western Australia, Perth.
 Württemberg: Königliche Landesbibliothek, Stuttgart.

DEPOSITORY OF PARTIAL SETS.

Alberta: Legislative Library, Edmonton.
 Alsace-Lorraine: K. Ministerium für Elsass-Lothringen, Strassburg.
 Bolivia: Ministerio de Colonización y Agricultura, La Paz.
 Bremen: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
 British Columbia: Legislative Library, Victoria.
 Bulgaria: Minister of Foreign Affairs, Sofia.
 Ceylon: United States Consul, Colombo.
 Ecuador: Biblioteca Nacional, Quito.
 Egypt: Bibliothèque Khédiviale, Cairo.
 Guatemala: Secretary of the Government, Guatemala.

Hamburg: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
 Hesse: Grossherzogliche Hof-Bibliothek, Darmstadt.
 Honduras: Secretary of the Government, Tegucigalpa.
 Jamaica: Colonial Secretary, Kingston.
 Liberia: Department of State, Monrovia.
 Lourenço Marquez: Government Library, Lourenço Marquez.
 Malta: Lieutenant Governor, Valetta.
 Montenegro: Ministère des Affaires Étrangères, Cetinje.
 New Brunswick: Legislative Library, Fredericton.
 Newfoundland: Colonial Secretary, St. John's.
 Nicaragua: Superintendente de Archivos Nacionales, Managua.
 Northwest Territories: Government Library, Regina.
 Nova Scotia: Provincial Secretary of Nova Scotia, Halifax.
 Panama: Secretaria de Relaciones Exteriores, Panama.
 Paraguay: Oficina General de Inmigracion, Asuncion.
 Prince Edward Island: Legislative Library, Charlottetown.
 Roumania: Academia Romana, Bucarest.
 Salvador: Ministerio de Relaciones Exteriores, San Salvador.
 Slam: Department of Foreign Affairs, Bangkok.
 Straits Settlements: Colonial Secretary, Singapore.
 United Provinces of Agra and Oudh: Under Secretary to Government, Allahabad.
 Vienna: Bürgermeister der Haupt- und Residenz-Stadt.

No countries were added during the year to the list of those with which the immediate exchange of official parliamentary journals is carried on. While the number of countries at present taking part in this exchange with the United States is 29, the total number of copies of the Congressional Record transmitted is 34—2 copies being sent to some of the countries, 1 to the upper and 1 to the lower House of Parliament.

The Records are received from the Government Printing Office on the morning following the date of their issue. They are at once placed in envelopes and forwarded to their destinations by mail.

A complete list of countries to which the Congressional Record is now sent is given below:

Argentine Republic.	Great Britain.	Roumania.
Australia.	Greece.	Russia.
Austria.	Guatemala.	Servia.
Baden.	Honduras.	Spain.
Belgium.	Hungary.	Switzerland.
Brazil.	Italy.	Transvaal.
Canada.	New South Wales.	Union of South Africa.
Cuba.	New Zealand.	Uruguay.
Denmark.	Portugal.	Western Australia.
France.	Prussia.	

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of bureaus or agencies through which the distribution of exchanges is effected. Those in the larger and many in the smaller countries forward to the Smithsonian Institution, in return, contributions for distribution in the United States:

Algeria, via France.

Angola, via Portugal.

Argentina: Comisión Protectora de Bibliotecas Populares, Reconquista 538, Buenos Aires.

Austria: K. K. Statistische Central-Commission, Vienna.

Azores, via Portugal.

Belgium: Service Belge des Échanges Internationaux, Rue du Musée 5, Brussels.

Bolivia: Oficina Nacional de Estadística, La Paz

Brazil: Serviço de Permutações Internacionais, Bibliotheca Nacional, Rio de Janeiro.

British Colonies: Crown Agents for the Colonies, London.¹

British Guiana: Royal Agricultural and Commercial Society, Georgetown.

British Honduras: Colonial Secretary, Belize.

Bulgaria: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.

Canary Islands, via Spain.

Cape Colony: Government Stationery Department, Cape Town.

Chile: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

China: Zi-ka-wei Observatory, Shanghai.

Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogota.

Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.

Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.

Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.

Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Director-General, Survey Department, Giza (Mudiria).

France: Service Français des Echanges Internationaux, 110 Rue de Grenelle, Paris.

Germany: Amerika-Institut, Berlin, N. W. 7.

Great Britain and Ireland: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

Greece: Bibliothèque Nationale, Athens.

Greenland, via Denmark.

Guadeloupe, via France.

Guatemala: Instituto Nacional de Varones, Guatemala.

Guinea, via Portugal.

Haiti: Secrétaire d'Etat des Relations Extérieures, Port au Prince.

Honduras: Biblioteca Nacional, Tegucigalpa.

Hungary: Dr. Julius Pikler, Municipal Office of Statistics, City Hall, Budapest.

Iceland, via Denmark.

India: India Store Department, India Office, London.

Italy: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

¹ This method is employed for communicating with several of the British colonies with which no medium is available for forwarding exchanges direct.

- Jamaica : Institute of Jamaica, Kingston.
 Japan : Imperial Library of Japan, Tokyo.
 Java, via Netherlands.
 Korea : His Imperial Japanese Majesty's Residency-General, Seoul.
 Liberia : Department of State, Monrovia.
 Lourenço Marquez : Government Library, Lourenço Marquez.
 Luxembourg, via Germany.
 Madagascar, via France.
 Madeira, via Portugal.
 Montenegro : Ministère des Affaires Étrangères, Cetinje.
 Mozambique, via Portugal.
 Natal : High Commissioner for the Union of South Africa, London.
 Netherlands : Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.
 New Guinea, via Netherlands.
 New South Wales : Board for International Exchanges, Public Library, Sydney.
 New Zealand : Dominion Museum, Wellington.
 Nicaragua : Ministerio de Relaciones Exteriores, Managua.
 Norway : Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.
 Panama : Secretaría de Relaciones Exteriores, Panama.
 Paraguay : Ministerio de Relaciones Exteriores, Asuncion.
 Persia : Board of Foreign Missions of the Presbyterian Church, New York City.
 Peru : Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
 Portugal : Serviço de Permutações Internacionais, Bibliotheca Nacional, Lisbon.
 Queensland : Chief Secretary's Office, Brisbane.
 Russia : Commission Russe des Echanges Internationaux, Bibliothèque Impériale Publique, St. Petersburg.
 Salvador : Ministerio de Relaciones Exteriores, San Salvador.
 Servia : Section Administrative du Ministère des Affaires Etrangères, Belgrade.
 Siam : Department of Foreign Affairs, Bangkok.
 South Australia : Public Library of South Australia, Adelaide.
 Spain : Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
 Sumatra, via Netherlands.
 Sweden : Kongliga Svenska Vetenskaps Akademien, Stockholm.
 Switzerland : Service des Echanges Internationaux, Bibliothèque Fédérale Centrale, Bern.
 Syria : Board of Foreign Missions of the Presbyterian Church, New York.
 Tasmania : Royal Society of Tasmania, Hobart.
 Transvaal : Government Library, Pretoria.
 Trinidad : Victoria Institute, Port of Spain.
 Tunis, via France.
 Turkey : American Board of Commissioners for Foreign Missions, Boston.
 Uruguay : Oficina de Canje Internacional, Montevideo.
 Venezuela : Biblioteca Nacional, Caracas.
 Victoria : Public Library of Victoria, Melbourne.
 Western Australia : Public Library of Western Australia, Perth.
 Windward and Leeward Islands : Imperial Department of Agriculture, Bridgetown, Barbados.

Table showing the number of institutions and individuals in foreign countries to which packages were transmitted through the International Exchange Service during the first six months of the fiscal year 1912.

	Organi- zations.	Individ- uals.		Organi- zations.	Individ- uals.
Africa:			America (North)—Contd.		
Algeria.....	13	25	West Indies—Contd.		
Angola.....	1	.....	St. Lucia.....	1	.....
Azores.....	4	1	St. Thomas.....	1	.....
Canary Islands.....	2	.....	St. Vincent.....	1	1
Cape Colony.....	38	30	San Domingo.....	4	2
East Africa and Uganda Protectorates.....	4	7	Trinidad.....	8	8
Egypt.....	21	15	America (South):		
German East Africa.....	3	2	Argentina.....	65	95
Gold Coast.....	1	1	Bolivia.....	9	6
Lagos.....	1	1	Brazil.....	63	55
Liberia.....	5	7	British Guiana.....	6	4
Lourenço Marquez.....	2	1	Chile.....	38	40
Madagascar.....	3	.....	Colombia.....	13	6
Madeira.....	1	1	Dutch Guiana.....	2	.....
Mauritius.....	7	3	Ecuador.....	9	15
Morocco.....	.....	1	French Guiana.....	.....	1
Natal.....	17	14	Paraguay.....	10	3
Orange Free State.....	3	8	Peru.....	28	24
Reunion.....	4	2	Uruguay.....	19	13
Rhodesia.....	2	11	Venezuela.....	13	11
St. Helena.....	1	.....	Asia:		
Sierra Leone.....	3	2	Burma.....	3	6
Transvaal.....	22	31	Ceylon.....	12	8
Tripoli.....	.....	3	China.....	24	64
Tunis.....	4	6	Cyprus.....	3	1
Zanzibar.....	1	.....	French East Indies.....	1	.....
America (North):			Hongkong.....	7	3
Canada.....	131	323	India.....	122	85
Central America—			Indo-China.....	5	4
British Honduras.....	6	6	Japan.....	95	155
Costa Rica.....	11	10	Korea.....	2	8
Guatemala.....	10	6	Macao.....	1	.....
Honduras.....	6	6	Malasia—		
Nicaragua.....	4	10	Java.....	17	13
Panama.....	1	10	Philippine Islands.....	3	1
Salvador.....	11	10	Sarawak.....	2	.....
Greenland.....	1	.....	Persia.....	.....	2
Mexico.....	48	70	Siam.....	3	4
Newfoundland.....	7	3	Straits Settlements.....	14	8
West Indies—			Australasia:		
Antigua.....	3	1	New South Wales.....	50	59
Bahamas.....	4	1	New Zealand.....	45	62
Barbados.....	7	9	Queensland.....	30	22
Bermudas.....	2	6	South Australia.....	25	24
Cuba.....	20	11	Tasmania.....	19	11
Dominica.....	1	.....	Victoria.....	65	67
Grenada.....	1	.....	Western Australia.....	23	15
Haiti.....	2	.....	Europe:		
Jamaica.....	10	9	Austria-Hungary.....	293	424
St. Christopher.....	1	.....	Belgium.....	153	116
			Bulgaria.....	10	9

Table showing the number of institutions and individuals in foreign countries to which packages were transmitted through the International Exchange Service during the first six months of the fiscal year 1912—Continued.

	Organi- zations.	Individ- uals.		Organi- zations.	Individ- uals.
Europe—Continued.			Europe—Continued.		
Denmark.....	51	48	Russia.....	217	256
France.....	682	702	Servia.....	10	2
Germany.....	957	1,233	Spain.....	75	62
Great Britain.....	1,012	1,794	Sweden.....	91	127
Greece.....	18	17	Switzerland.....	48	154
Iceland.....	7	5	Turkey.....	20	28
Italy.....	350	312	Polynesia:		
Luxemburg.....	6	.....	Fiji Islands.....	1	1
Malta.....	6	1	New Hebrides.....	1	.....
Montenegro.....	1	.....		
Netherlands.....	104	139	Total correspondents,		
Norway.....	62	61	July 1, 1911, to Jan. 1,		
Portugal.....	36	14	1912.....	5,535	7,073
Roumania.....	24	9			

Respectfully submitted.

F. W. TRUE,
*Assistant Secretary in charge
of Library and Exchanges.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

OCTOBER 7, 1912.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to submit herewith a report of the operations of the National Zoological Park for the fiscal year ending June 30, 1912.

The general appropriation made by Congress for the improvement and maintenance of the park during that year was \$100,000. The cost of maintenance was \$86,132, being materially increased over that of the previous year mainly because of the advance in prices of forage and other food supplies, the expenditure for which amounted to \$21,175. A few small increases were made in the compensation of employees, but nothing to correspond with the great increase in the cost of living which has occurred during recent years.

ACCESSIONS.

Among these the most important were 2 elephant seals and 4 northern fur seals from the United States Bureau of Fisheries, 8 white pelicans from Lieut. Col. L. M. Brett, acting superintendent of the Yellowstone National Park, and a pair of American tapirs, which, with certain other animals, were received in exchange, as noted below. The accessions included about 25 species not already represented in the collection. Mammals and birds born and hatched numbered 108, and included American tapir, yak, American bison, harnessed antelope, Barasingha deer, llama, mona monkey, hairy armadillo, wild turkey, and Florida cormorant.

EXCHANGES.

The most important accession from this source was a shipment received in November, 1911, from the Municipal Zoological Garden at Buenos Aires, Argentine Republic, which comprised 23 animals and included a pair each of Brazilian tapirs, Patagonian cavies, and Chilean eagles, with other interesting mammals and birds. A sambar deer was received from the New York Zoological Park, and a considerable number of specimens from dealers.

ANIMALS IN THE COLLECTION JUNE 30, 1912.

MAMMALS.

Grivet monkey (<i>Cercopithecus sabæus</i>)	1	African palm civet (<i>Viverra civetta</i>)	1
Green monkey (<i>Cercopithecus callitrichus</i>)	1	Common genet (<i>Genetta genetia</i>)	2
Mona monkey (<i>Cercopithecus mona</i>)	3	Sudan lion (<i>Felis leo</i>)	2
Diana monkey (<i>Cercopithecus diana</i>)	2	Killimanjaro lion (<i>Felis leo sabakiensis</i>)	5
Sooty mangabey (<i>Cercocebus fuliginosus</i>)	2	Tiger (<i>Felis tigris</i>)	1
Bonnet monkey (<i>Macacus sinicus</i>)	1	Cougar (<i>Felis oregonensis hippolestes</i>)	1
Macaque monkey (<i>Macacus cynomolgus</i>)	4	Jaguar (<i>Felis onca</i>)	1
Pig-tailed monkey (<i>Macacus nemestrinus</i>)	4	Mexican jaguar (<i>Felis onca goldmani</i>)	1
Rhesus monkey (<i>Macacus rhesus</i>)	27	Leopard (<i>Felis pardus</i>)	2
Brown macaque (<i>Macacus arctoides</i>)	3	Black leopard (<i>Felis pardus</i>)	1
Japanese monkey (<i>Macacus fuscatus</i>)	3	Serval (<i>Felis serval</i>)	1
Formosan rock-macaque (<i>Macacus cyclops</i>)	1	Ocelot (<i>Felis pardalis</i>)	1
Chacma (<i>Papio porcarius</i>)	1	Canada lynx (<i>Lynx canadensis</i>)	1
Mandrill (<i>Papio maimon</i>)	4	Bay lynx (<i>Lynx rufus</i>)	5
White-throated capuchin monkey (<i>Cebus hypoleucus</i>)	1	Spotted lynx (<i>Lynx rufus texensis</i>)	2
Brown monkey (<i>Cebus fatuellus</i>)	1	Florida lynx (<i>Lynx rufus floridanus</i>)	1
Marmoset (<i>Hapale jacchus</i>)	1	Steller's sea lion (<i>Eumetopias stelleri</i>)	1
Ruffed lemur (<i>Lemur varius</i>)	2	California sea lion (<i>Zalophus californianus</i>)	2
Ring-tailed lemur (<i>Lemur catta</i>)	1	Northern fur seal (<i>Callotaria alascanus</i>)	2
Polar bear (<i>Thalarctos maritimus</i>)	3	Harbor seal (<i>Phoca vitulina</i>)	2
European brown bear (<i>Ursus arctos</i>)	2	Fox squirrel (<i>Sciurus niger</i>)	9
Kadiak bear (<i>Ursus middendorffi</i>)	1	Western fox squirrel (<i>Sciurus ludovicianus</i>)	8
Yakutat bear (<i>Ursus dalli</i>)	1	Gray squirrel (<i>Sciurus carolinensis</i>)	40
Alaskan brown bear (<i>Ursus gyas</i>)	3	Black squirrel (<i>Sciurus carolinensis</i>)	20
Hybrid bear (<i>Ursus gyas-arctos</i>)	1	Albino squirrel (<i>Sciurus carolinensis</i>)	1
Kidder's bear (<i>Ursus kidderi</i>)	2	Panama squirrel	1
Himalayan bear (<i>Ursus thibetanus</i>)	1	Prairie dog (<i>Cynomys ludovicianus</i>)	25
Grizzly bear (<i>Ursus horribilis</i>)	4	Woodchuck (<i>Arctomys monax</i>)	7
Black bear (<i>Ursus americanus</i>)	9	Albino woodchuck (<i>Arctomys monax</i>)	1
Cinnamon bear (<i>Ursus americanus</i>)	3	Black woodchuck (<i>Arctomys monax</i>)	1
Sloth bear (<i>Melursus ursinus</i>)	1	Alpine marmot (<i>Arctomys marmotta</i>)	3
Kinkajou (<i>Cercoleptes caudivolvulus</i>)	1	American beaver (<i>Castor canadensis</i>)	3
Cacomistle (<i>Bassariscus astuta</i>)	1	Coypu (<i>Myocastor coypus</i>)	2
Gray coatimundi (<i>Nasua narica</i>)	3	Itutia-conga (<i>Capromys pilorides</i>)	2
Raccoon (<i>Procyon lotor</i>)	17	Indian porcupine (<i>Hystrix leucura</i>)	2
American badger (<i>Taxidea americana</i>)	3	Mexican agouti (<i>Dasyprocta mexicanus</i>)	1
Common skunk (<i>Mephitis mephitis</i>)	1	Azara's agouti (<i>Dasyprocta azarae</i>)	2
American marten (<i>Mustela americana</i>)	3	Crested agouti (<i>Dasyprocta cristata</i>)	2
Fisher (<i>Mustela pennanti</i>)	1	Hairy-rumped agouti (<i>Dasyprocta prymnolopha</i>)	4
Mink (<i>Putorius vison</i>)	5	Paca (<i>Cælogenyx paca</i>)	2
Common ferret (<i>Putorius putorius</i>)	1	Guinea pig (<i>Cavia cutleri</i>)	13
Black-footed ferret (<i>Putorius nigripes</i>)	2	Patagonian cavy (<i>Dolichotis patagonica</i>)	3
North American otter (<i>Lutra canadensis</i>)	5	Domestic rabbit (<i>Lepus cuniculus</i>)	37
Eskimo dog (<i>Canis familiaris</i>)	2	Cape hyrax (<i>Procapra capensis</i>)	1
Dingo (<i>Canis dingo</i>)	2	Indian elephant (<i>Elephas maximus</i>)	1
Gray wolf (<i>Canis occidentalis</i>)	4	Brazilian tapir (<i>Tapirus americanus</i>)	4
Black wolf (<i>Canis occidentalis</i>)	1	Grevy's zebra (<i>Equus grevyi</i>)	1
Coyote (<i>Canis latrans</i>)	4	Zebra-donkey hybrid (<i>Equus grevyi-asinus</i>)	1
Woodhouse's coyote (<i>Canis frustror</i>)	3	Grant's zebra (<i>Equus burchelli granti</i>)	1
Crab-eating dog (<i>Canis cancrivorus</i>)	1	Collared peccary (<i>Dicotyles angulatus</i>)	6
Red fox (<i>Vulpes pennsylvanicus</i>)	4	Wild boar (<i>Sus scrofa</i>)	2
Swift fox (<i>Vulpes velox</i>)	2	Northern wart hog (<i>Phacochoerus africanus</i>)	2
Arctic fox (<i>Vulpes lagopus</i>)	2	Hippopotamus (<i>Hippopotamus amphibius</i>)	1
Gray fox (<i>Urocyon cinereo-argenteus</i>)	5		
Striped hyena (<i>Hyæna striata</i>)	1		

Animals in the collection June 30, 1912—Continued.

MAMMALS—Continued.

Guanaco (<i>Lama huanachus</i>)-----	3	Indian antelope (<i>Antilope cervicapra</i>)--	3
Llama (<i>Lama glama</i>)-----	8	Nilgai (<i>Boselaphus tragocamelus</i>)-----	2
Alpaca (<i>Lama pacos</i>)-----	2	Congo harnessed antelope (<i>Tragelaphus</i>	
Vicugna (<i>Lama vicugna</i>)-----	2	<i>gratus</i>)-----	2
Bactrian camel (<i>Camelus bactrianus</i>)--	3	East African eland (<i>Oreas canna pat-</i>	
Muntjac (<i>Cervulus muntjac</i>)-----	1	<i>tersontianus</i>)-----	1
Sambar deer (<i>Cervus aristotelis</i>)-----	2	Chamois (<i>Rupicapra tragus</i>)-----	2
Philippine deer (<i>Cervus philippinus</i>)--	1	Tahr (<i>Hemitragus jemlatus</i>)-----	7
Hog deer (<i>Cervus porcinus</i>)-----	6	Common goat (<i>Capra hircus</i>)-----	8
Barasingha deer (<i>Cervus duvaucellii</i>)--	10	Angora goat (<i>Capra hircus</i>)-----	5
Axis deer (<i>Cervus axis</i>)-----	6	Barbary sheep (<i>Ovis tragelaphus</i>)-----	12
Japanese deer (<i>Cervus sika</i>)-----	10	Barbados sheep (<i>Ovis aries-tragela-</i>	
Red deer (<i>Cervus elaphus</i>)-----	6	<i>phus</i>)-----	13
American elk (<i>Cervus canadensis</i>)-----	7	Anoa (<i>Anoa depressicornis</i>)-----	1
Fallow deer (<i>Cervus dama</i>)-----	6	East African buffalo (<i>Buffelus neu-</i>	
Reindeer (<i>Rangifer tarandus</i>)-----	1	<i>manni</i>)-----	1
Virginia deer (<i>Odocoileus virginianus</i>)--	9	Zebu (<i>Bibos indicus</i>)-----	3
Mule deer (<i>Odocoileus hemionus</i>)-----	1	Yak (<i>Poephus grunniens</i>)-----	3
Columbian black-tailed deer (<i>Odocoi-</i>		American bison (<i>Bison americanus</i>)--	14
<i>leus columbianus</i>)-----	1	Hairy armadillo (<i>Dasypus villosus</i>)--	3
Cuban deer (<i>Odocoileus sp.</i>)-----	1	Wallaroo (<i>Macropus robustus</i>)-----	2
Prong-horn antelope (<i>Antilocapra</i>		Bennett's wallaby (<i>Macropus ruficollis</i>	
<i>americana</i>)-----	1	<i>bennetti</i>)-----	1
Coke's hartebeest (<i>Bubalis cokei</i>)-----	2	Virginia opossum (<i>Didelphys marsu-</i>	
Bontebok (<i>Damaliscus pygargus</i>)-----	1	<i>pialis</i>)-----	2
Blessbok (<i>Damaliscus albifrons</i>)-----	1	Common wombat (<i>Phascolumys mitch-</i>	
White-tailed gnu (<i>Connochaetes gnu</i>)--	1	<i>elli</i>)-----	1
Defassa water buck (<i>Cobus defassa</i>)--	1		

BIRDS.

European blackbird (<i>Merula merula</i>)--	1	Red-crested cardinal (<i>Paroaria cucul-</i>	
Brown thrasher (<i>Toxostoma rufum</i>)--	1	<i>ata</i>)-----	10
Japanese robin (<i>Liothrix luteus</i>)-----	12	Common cardinal (<i>Cardinalis cardi-</i>	
White-checked bulbul (<i>Pycnonotus leu-</i>		<i>nalis</i>)-----	1
<i>cogenys</i>)-----	5	Siskin (<i>Spinus spinus</i>)-----	8
Black bulbul (<i>Pycnonotus pygæus</i>)--	3	European goldfinch (<i>Carduelis elegans</i>)--	3
Laughing thrush (<i>Garrulus leuco-</i>		Yellow hammer (<i>Emberiza citrinella</i>)--	1
<i>lophus</i>)-----	2	Common canary (<i>Serinus canarius</i>)--	15
Bishop finch (<i>Tanagra episcopus</i>)-----	4	Linnet (<i>Linota cannabina</i>)-----	4
Orange-checked waxbill (<i>Estrela mel-</i>		Bullfinch (<i>Pyrrhula europæa</i>)-----	10
<i>poda</i>)-----	6	Hooded oriole (<i>Icterus cucullatus</i>)--	3
Amaduvade finch (<i>Estrela amandava</i>)--	4	Cowbird (<i>Molothrus ater</i>)-----	1
Cordon-bleu (<i>Estrela phænicotis</i>)-----	8	Glossy starling (<i>Lamprolornis cau-</i>	
Magpie finch (<i>Spermestes fringilloides</i>)--	10	<i>datus</i>)-----	1
Cut-throat finch (<i>Amadina fasciata</i>)--	11	European raven (<i>Corvus corax</i>)-----	1
Zebra finch (<i>Amadina castanotis</i>)-----	4	American raven (<i>Corvus corax sinua-</i>	
Black-headed finch (<i>Munia atricapilla</i>)--	11	<i>tus</i>)-----	1
Three-colored finch (<i>Munia malacca</i>)--	7	Common crow (<i>Corvus brachyrhyn-</i>	
White-headed finch (<i>Munia maja</i>)-----	9	<i>chos</i>)-----	2
Nutmeg finch (<i>Munia punctularia</i>)--	6	Green jay (<i>Xanthoura luzuosa</i>)-----	1
Java sparrow (<i>Munia oryzivora</i>)-----	14	White-throated jay (<i>Garrulus leucotis</i>)--	2
White Java sparrow (<i>Munia cryzivora</i>)--	15	Blue jay (<i>Cyanocitta cristata</i>)-----	3
Chestnut-breasted finch (<i>Donacola</i>		American magpie (<i>Pica pica hud-</i>	
<i>castaneothorax</i>)-----	10	<i>sonica</i>)-----	1
Parson finch (<i>Poephila cincta</i>)-----	1	Red-billed magpie (<i>Uroctissa occipi-</i>	
Lady Gould's finch (<i>Poephila gouldiæ</i>)--	1	<i>talis</i>)-----	2
Bearded finch (<i>Spermophila sp.</i>)-----	2	Piping crow (<i>Gymnorhina tibicen</i>)-----	2
Napoleon weaver (<i>Pyromelana afra</i>)--	4	Yellow tyrant (<i>Pitangus derbianus</i>)--	2
Madagascar weaver (<i>Foudia madagas-</i>		Giant kingfisher (<i>Dacelo gigas</i>)-----	1
<i>cartensis</i>)-----	8	Yellow-breasted toucan (<i>Ramphastos</i>	
Red-billed weaver (<i>Quelea quelea</i>)-----	8	<i>carinatus</i>)-----	3
Whydah weaver (<i>Vidua paradisæa</i>)-----	16	Sulphur-crested cockatoo (<i>Cacatua gal-</i>	
Painted bunting (<i>Passerina ciris</i>)-----	1	<i>erita</i>)-----	3

Animals in the collection June 30, 1912—Continued.

BIRDS—Continued.

White cockatoo (<i>Cacatua alba</i>)-----	6	South American condor (<i>Sarcorhamphus gryphus</i>)-----	2
Leadbeater's cockatoo (<i>Cacatua leadbeateri</i>)-----	1	California condor (<i>Gymnogyps californianus</i>)-----	3
Bare-eyed cockatoo (<i>Cacatua gymnopsis</i>)--	2	Griffon vulture (<i>Gyps fulvus</i>)-----	2
Roseate cockatoo (<i>Cacatua roseicapilla</i>)-----	3	Cinereous vulture (<i>Vultur monachus</i>)--	2
Gang-gang cockatoo (<i>Callocephalon galeatum</i>)-----	1	Egyptian vulture (<i>Neophron percnopterus</i>)-----	1
Yellow and blue macaw (<i>Ara ararauna</i>)-----	2	Turkey vulture (<i>Cathartes aura</i>)-----	5
Red and yellow and blue macaw (<i>Ara macao</i>)-----	3	Black vulture (<i>Catharista urubi</i>)-----	2
Red and blue macaw (<i>Ara chloroptera</i>)-----	3	King vulture (<i>Gypagus papa</i>)-----	2
Great green macaw (<i>Ara militaris</i>)-----	1	Ring dove (<i>Columba palumbus</i>)-----	14
Kea (<i>Nestor notabilis</i>)-----	1	Snow pigeon (<i>Columba leuconota</i>)-----	4
Mexican conure (<i>Conurus holochlorus</i>)--	1	Red-billed pigeon (<i>Columba flaviventris</i>)-----	4
Carolina parakeet (<i>Conuropsis carolinensis</i>)-----	2	Mourning dove (<i>Zenaidura macroura</i>)--	8
Cuban parrot (<i>Amazona leucocephala</i>)--	2	Peaceful dove (<i>Geopelia tranquilla</i>)--	2
Orange-winged amazon (<i>Amazona amazonica</i>)-----	3	Cape dove (<i>Ena capensis</i>)-----	1
Porto Rican amazon (<i>Amazona vittata</i>)-----	1	Blood-breasted pigeon (<i>Phlogoenas luzonica</i>)-----	4
Yellow-shouldered amazon (<i>Amazona ochroptera</i>)-----	2	Victoria crowned pigeon (<i>Goura victoria</i>)-----	1
Yellow-fronted amazon (<i>Amazona ochrocephala</i>)-----	2	Purplish guan (<i>Penelope purpurascens</i>)-----	1
Yellow-headed amazon (<i>Amazona leucillanti</i>)-----	2	Crested curassow (<i>Crax alector</i>)-----	2
Blue-fronted amazon (<i>Amazona aestiva</i>)-----	1	Mexican curassow (<i>Crax globiceps</i>)-----	2
Lesser vasa parrot (<i>Coracopsis nigra</i>)--	4	Chapman's curassow (<i>Crax chapmani</i>)--	1
Banded parakeet (<i>Palæornis fasciata</i>)--	2	Daubenton's curassow (<i>Crax daubentoni</i>)-----	1
Rosella parakeet (<i>Platycercus eximius</i>)-----	1	Wild turkey (<i>Meleagris gallopavo silvestris</i>)-----	16
Love bird (<i>Agapornis pullaria</i>)-----	1	Peafowl (<i>Pavo cristata</i>)-----	60
Green parakeet (<i>Loriculus sp.</i>)-----	2	Jungle fowl (<i>Gallus bankiva</i>)-----	1
Shell parakeet (<i>Melopsittacus undulatus</i>)-----	4	Reeves's pheasant (<i>Phasianus reevesi</i>)--	1
Great horned owl (<i>Bubo virginianus</i>)--	2	Golden pheasant (<i>Thaumalea picta</i>)-----	1
Arctic horned owl (<i>Bubo virginianus subarcticus</i>)-----	3	Silver pheasant (<i>Euplocamus nycthemerus</i>)-----	1
Screech owl (<i>Otus asio</i>)-----	2	European quail (<i>Coturnix communis</i>)--	1
Barred owl (<i>Strix varia</i>)-----	1	Hungarian partridge (<i>Perdix perdix</i>)--	3
Sparrow hawk (<i>Falco sparverius</i>)-----	1	Boobywhite (<i>Colinus virginianus</i>)-----	5
Bald eagle (<i>Haliaeetus leucocephalus</i>)--	12	Mountain quail (<i>Oreortyx picta</i>)-----	2
Alaskan bald eagle (<i>Haliaeetus leucocephalus alascanus</i>)-----	1	Scaled quail (<i>Callipepla squamata</i>)-----	1
Golden eagle (<i>Aquila chrysaetos</i>)-----	1	California quail (<i>Lophortyx californica</i>)	1
Short-tailed eagle (<i>Terathopius ecaudatus</i>)-----	2	Massena quail (<i>Cyrtonyx montezumae</i>)--	10
Harpy eagle (<i>Thrasaetus harpyia</i>)-----	2	Purple gallinule (<i>Porphyrio ceryleus</i>)-----	1
Chilian eagle (<i>Geranoaetus melanoleucus</i>)-----	8	Black-backed gallinule (<i>Porphyrio melanotus</i>)-----	2
Crowned hawk eagle (<i>Spizaetus coronatus</i>)-----	1	Martinique gallinule (<i>Ionornis martinicus</i>)-----	1
Red-tailed hawk (<i>Buteo borealis</i>)-----	1	American coot (<i>Fulica americana</i>)-----	11
Broad-winged hawk (<i>Buteo platypterus</i>)-----	1	Flightless rail (<i>Ocydromus australis</i>)--	1
Venezuelan hawk-----	1	Common carlama (<i>Carlama cristata</i>)-----	1
Caracara (<i>Polyborus cheriway</i>)-----	1	Demoiselle crane (<i>Anthropoides virgo</i>)--	9
Lammergeyer (<i>Gypaetus barbatus</i>)-----	3	Crowned crane (<i>Baelearica pavonina</i>)--	2
	1	Sandhill crane (<i>Grus mexicana</i>)-----	2
		Australian crane (<i>Grus australisiana</i>)--	1
		European crane (<i>Grus cinerea</i>)-----	2
		Sarus crane (<i>Grus antigone</i>)-----	2
		Indian white crane (<i>Grus leucogeranus</i>)--	2
		Thick-knee (<i>Ardeotis gallinulus</i>)-----	1
		Ruff (<i>Machetes pugnax</i>)-----	4
		Black-crowned night heron (<i>Nycticorax nycticorax naevius</i>)-----	122

Animals in the collection June 30, 1912—Continued.

BIRDS—Continued.

Little blue heron (<i>Florida carulea</i>)----	1	Lesser snow goose (<i>Chen hyperboreus</i>)----	2
Reddish egret (<i>Dichromanassa rufescens</i>)-----	3	Greater snow goose (<i>Chen hyperboreus nivalis</i>)-----	1
Snowy egret (<i>Egretta candidissima</i>)----	4	American white-fronted goose (<i>Anser albifrons gambeli</i>)-----	4
Great white heron (<i>Herodias egretta</i>)----	1	Chinese goose (<i>Anser cygnoides</i>)-----	3
Great blue heron (<i>Ardea herodias</i>)-----	3	Red-headed duck (<i>Marila americana</i>)----	1
Great black-crowned heron (<i>Ardea cocoi</i>)-----	1	Wood duck (<i>Aix sponsa</i>)-----	8
Boat-bill (<i>Cancroma cochlearia</i>)-----	2	Mandarin duck (<i>Dendronessa galeri- culata</i>)-----	5
Bittern (<i>Botaurus lentiginosus</i>)-----	1	Pintail (<i>Dafla acuta</i>)-----	4
Black stork (<i>Ciconia nigra</i>)-----	1	Shoveler duck (<i>Spatula clypeata</i>)----	2
White stork (<i>Ciconia ciconia</i>)-----	1	Black duck (<i>Anas rubripes</i>)-----	1
Marabou stork (<i>Leptoptilus dubus</i>)----	1	Mallard (<i>Anas platyrhynchos</i>)-----	13
Wood ibis (<i>Mycteria americana</i>)-----	2	American white pelican (<i>Pelecanus erythrorhynchos</i>)-----	10
Sacred ibis (<i>Ibis æthiopica</i>)-----	4	European white pelican (<i>Pelecanus onocrotalus</i>)-----	1
White ibis (<i>Guara alba</i>)-----	22	Roseate pelican (<i>Pelecanus roseus</i>)----	1
Roseate spoonbill (<i>Ajaja ajaja</i>)-----	1	Brown pelican (<i>Pelecanus occiden- talis</i>)-----	5
European flamingo (<i>Phenicopterus antiquorum</i>)-----	5	Black-backed gull (<i>Larus marinus</i>)----	1
Crested screamer (<i>Chauna cristata</i>)----	3	Herring gull (<i>Larus argentatus</i>)-----	4
Tufted swan (<i>Olor buccinator</i>)-----	1	American herring gull (<i>Larus argenta- tus smithsonianus</i>)-----	6
Whistling swan (<i>Olor columbianus</i>)----	3	Laughing gull (<i>Larus atricilla</i>)-----	3
Mute swan (<i>Cygnus gibbus</i>)-----	2	Florida cormorant (<i>Phalacrocorax auri- tus floridanus</i>)-----	12
Black swan (<i>Chenopsis atrata</i>)-----	2	Mexican cormorant (<i>Phalacrocorax vigua mexicanus</i>)-----	1
Muscovy duck (<i>Cairina moschata</i>)-----	1	Water turkey (<i>Anhinga anhinga</i>)-----	5
White muscovy duck (<i>Cairina mos- chata</i>)-----	2	Somali ostrich (<i>Struthio molybdo- phanes</i>)-----	1
Wandering tree-duck (<i>Dendrocygna arcuata</i>)-----	7	Common cassowary (<i>Casuarus gale- atus</i>)-----	1
Fulvous tree-duck (<i>Dendrocygna bi- color</i>)-----	2	Common rhea (<i>Rhea americana</i>)-----	3
Egyptian goose (<i>Chenalopec ægyptia- cus</i>)-----	1	Emu (<i>Dromæus novæ hollandiæ</i>)-----	1
Brant (<i>Branta bernicla glaucogastra</i>)----	1		
Canada goose (<i>Branta canadensis</i>)----	8		
Hutchins's goose (<i>Branta canadensis hutchinsii</i>)-----	3		

REPTILES.

Alligator (<i>Alligator mississippiensis</i>)----	18	Black snake (<i>Zamenis constrictor</i>)-----	1
Painted turtle (<i>Chrysemys picta</i>)-----	4	Coach-whip snake (<i>Zamenis flagellum</i>)----	1
Diamond-back terrapin (<i>Malacoclemys palustris</i>)-----	1	Corn snake (<i>Coluber guttatus</i>)-----	1
Three-toed box-tortoise (<i>Cistudo triun- gulus</i>)-----	6	Common chicken snake (<i>Colubus quad- rivittatus</i>)-----	2
Painted box-tortoise (<i>Cistudo ornata</i>)----	4	Gopher snake (<i>Compsosoma corais couperi</i>)-----	4
Gopher turtle (<i>Xerobates polyphemus</i>)----	1	Pine snake (<i>Pityophis melanoleucus</i>)----	6
Duncan Island tortoise (<i>Testudo ephip- pium</i>)-----	2	Bull snake (<i>Pityophis sayi</i>)-----	1
Albemarle Island tortoise (<i>Testudo vicina</i>)-----	1	Texas chicken snake (<i>Ophibolus calli- gaster</i>)-----	2
Alligator lizard (<i>Sceloporus undulatus</i>)----	1	King snake (<i>Ophibolus getulus</i>)-----	1
Horned lizard (<i>Phrynosoma cornutum</i>)----	1	Common garter snake (<i>Eutania sirta- lis</i>)-----	1
Gila monster (<i>Heloderma suspectum</i>)----	5	Texas water snake (<i>Eutania proxima</i>)----	1
Glass snake (<i>Ophisaurus ventralis</i>)-----	1	Water moccasin (<i>Ancistrodon pisci- vorus</i>)-----	1
Anaconda (<i>Eunectes murinus</i>)-----	2	Copperhead (<i>Ancistrodon contortrix</i>)----	5
Common boa (<i>Boa constrictor</i>)-----	1	Diamond rattlesnake (<i>Crotalus ada- manteus</i>)-----	3
Antillean boa (<i>Boa diviniolua</i>)-----	1	Banded rattlesnake (<i>Crotalus horri- dus</i>)-----	1
Cuban tree-boa (<i>Epicrates angulifer</i>)----	3		
Spreading adder (<i>Heterodon platyrhi- nus</i>)-----	1		

GIFTS.

The following persons presented animals to the park during the year:

Miss Frances Gage Allison, New Bedford, Mass., a Diana monkey.
 Mrs. J. B. Ames, Winchester, Va., an albino squirrel.
 Mr. D. R. Anthony, jr., Washington, D. C., an alligator.
 Mr. Oscar E. Baynard, Washington, D. C., a black vulture.
 Mr. August Busck, Washington, D. C., a Panama squirrel.
 Maj. H. W. Carpenter, U. S. M. C., ret., Berryville, Va., two Cuban parrots.
 Mr. J. R. Eddy, Lamedeer, Mont., a western porcupine.
 Dr. Chas. W. Ely, Frederick, Md., a barred owl.
 Mr. W. H. Emery, jr., Washington, D. C., an alligator.
 Mr. Victor J. Evans, Washington, D. C., two marmosettes.
 Mr. Wallace Evans, Oak Park, Ill., a mink.
 Mr. Gale, Washington, D. C., a horned lizard.
 Mr. W. S. S. Groh, Ashburn, Va., a common raccoon.
 Mr. John B. Henderson, jr., Washington, D. C., two common canaries.
 Mr. Holmes, Washington, D. C., a common opossum.
 Mrs. Kenrolde, Washington, D. C., a woodchuck.
 Mr. W. P. Mattoon, Washington, D. C., a "glass snake."
 Mr. F. A. Milligan, Washington, D. C., a common canary.
 Mr. Russell H. Millward, New York City, a paca.
 Mr. J. L. Narvell, Port Deposit, Md., two copperhead snakes.
 Mr. O. Schneider, Washington, D. C., two alligators.
 Messrs. D. A. Smith & L. E. Deaton, Walhalla, S. C., a bittern.
 Mr. S. Stansberg, Baltimore, Md., an alligator.
 Mr. F. B. Travis, Washington, D. C., a common rabbit.
 Master Horace Wadsworth, Washington, D. C., a love bird.
 Mrs. L. P. Wadsworth, Washington, D. C., two alligators.
 Mr. George A. Wise, Washington, D. C., a woodchuck.
 Mr. Thomas Zipp, Baltimore, Md., seven copperhead snakes.
 United States Bureau of Fisheries, two elephant seals and four northern fur seals.
 The Janitor, Balfour Apt., Washington, D. C., a sparrow hawk.
 Unknown donors, a barn owl and two alligators.

LOSSES OF ANIMALS.

The most important losses were a lion, wolverine, reindeer, and two northern fur seals from enteritis; a pair of elephant seals and a fur seal from pneumonia; four prong-horn antelopes from malignant catarrh of nose and throat, and an Alaskan brown bear and a springbok from tuberculosis. A female tiger was killed because of abnormal development of its shoulder. Quail disease was introduced through a shipment of birds from the West, but was isolated so that very little loss was occasioned. Dead animals to the number of 199 specimens were transferred to the National Museum. Autopsies were made as formerly by the Pathological Division of the Bureau of Animal Industry, Department of Agriculture.¹

¹ The causes of death were reported to be as follows: Enteritis, 24; gastritis, 4; gastro-enteritis, 9; enteritis from round worms, 4; intestinal coccidiosis, 4; quail disease,





NEW STONE BOILER HOUSE AND MACHINE SHOP IN THE NATIONAL ZOOLOGICAL PARK.

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

Presented	50
Received from Yellowstone National Park	8
Received in exchange	75
Lent	35
Purchased	234
Born and hatched in National Zoological Park	108
Total	510

SUMMARY.

Animals on hand July 1, 1911	1,414
Accessions during the year	510
Total	1,924
Deduct loss (by exchange, death, and returning of animals)	373
On hand June 30, 1912	1,551

Class.	Species.	Individuals.
Mammals	150	591
Birds	199	876
Reptiles	32	84
Total	381	1,551

VISITORS.

The number of visitors to the park during the year is estimated at 542,738, being a daily average of 1,487. The largest number in any one month was 95,485, in April, 1912, an average per day of 3,183.

During the year there visited the park 142 schools and classes, a total of 4,140 pupils, being a monthly average of 345. Besides those from the District of Columbia and neighboring States there were classes from Vermont, Massachusetts, New York, and Tennessee.

IMPROVEMENTS.

The amount remaining from the appropriation after providing for maintenance, was used mainly for improvements of a permanent character. The most important of these, and one urgently needed,

4; congestion of lungs, 19; pneumonia, 13; tuberculosis, 13; pulmonary edema, 2; purulent inflammation of lungs, 1; aspergillosis, 2; abscess, 5; malignant catarrh of nose and throat, 4; catarrh of nostrils, 1; congestion of liver, 5; necrosis of liver, 2; cancer of the liver, 1; osteomalacia, 2; necrosis of tail, 1; pericarditis, 1; peritonitis, 1; septicemia, 1; pyemic absorption, 1; hypertrophy of spleen, 1; impaction of intestine, 1; tympanitic colic, 1; rupture of egg in oviduct, 1; stomach worms, 1; subcutaneous parasitism, 1; rabies, 1; congelation, 2; starvation (snakes), 6; no cause found, 6; accident (fighting, killed by wild animals, etc.), 19.

was a fireproof building for the central heating plant. From this plant the animal houses and the workshop are heated, and as long as the boilers were housed in a flimsy, woden shed, part of which was used as a woodworking shop, there was serious risk of a disastrous fire. The new building is 46 feet by 56 feet, with walls of stone and concrete, and a roof of slate on concrete slabs, supported by steel roof framing. Two additional boilers were purchased and installed so that by using the boilers in alternation they may be cleaned and repaired whenever necessary without interrupting the operation of the plant. The storage vault for coal was enlarged, and a large concrete storage tank built for supplying warmed water to the tanks for the hippopotamus, tapirs, and alligators. The cost of the house, boilers, and other improvements connected with them, was \$5,850.

The series of yards on the west side of the antelope house was enlarged during the year. Light steel bars replaced the wire of the former fence, and wherever sufficient space was available, a double fence of the same character was used instead of solid partitions.

Adjoining the indoor quarters of the hippopotamus and the tapirs a yard 34 feet by 60 feet was constructed, in which was provided a good-sized bathing pool 6 feet deep.

Outdoor cages were installed along the east side of the small mammal house, completing the cage equipment of that building.

A number of inclosures for cattle, deer, and other animals were rebuilt during the year, and a substantial new shelter constructed for the zebus, vicognas, and alpacas.

Three small inclosures for semiaquatic animals were built near the otter and beaver yards, and a permanent walk constructed from that point to connect with the main walk to the west entrance.

The machines in the workshops of the park have heretofore been operated by steam power. As electric power can now be had, arrangement is being made to equip for its use as rapidly as is practicable. Two motors were purchased near the close of the year, also a circular saw with combination bench. Considerable economy in labor will be effected by these changes. Work was also begun on a small house for the storage and preparation of food.

The cost of these improvements was as follows:

House for central heating plant.....	\$5, 850
Yards on west side of antelope house.....	1, 500
Yard for hippopotamus and tapirs.....	950
Completing outdoor cages at small mammal house.....	525
Inclosures and shelters for cattle, deer, etc.....	800
Small inclosures and walk in beaver valley.....	450
Equipment for workshops.....	613
Beginning construction of food house.....	565
Total.....	11, 253

IMPORTANT NEEDS.

New bridge.—The log bridge that crosses the creek on the main driveway in the lower part of the park has for some time shown signs of weakness. A careful examination, by the engineer of bridges of the District of Columbia, showed that several of the logs were in an advanced stage of decay and that the whole structure would soon be unsafe. It was therefore recommended to Congress that an appropriation of \$20,000 be made for a permanent structure. At the time of writing it is known that such an appropriation was made. The construction of the new bridge will therefore be part of the work for the coming year.

Aviary.—In spite of all efforts the fine collections of birds in the park is very far from adequately housed. The wooden building in which the larger number are kept is too small, too low, insanitary and really unworthy of a national institution. It was built in the cheapest manner to meet an emergency and although considerable sums have been spent on it for repairs it is far from satisfactory. It is desired to build a suitable aviary in the western part of the park and to group about this the cages for the eagles, vultures, condors and owls now scattered somewhat irregularly about the grounds. It is believed that a suitable structure can be built for about \$80,000.

Hospital.—The statistics given above show that the animals are not exempt from diseases. Infective disorders are sometimes brought in by animals that have been kept in insanitary conditions on ship-board or in the collections of dealers. Even with the utmost care pathological conditions are likely to arise due to changes of habit due to captivity. Animals brought to the park from any place not known to be sanitary and free from disease should be properly quarantined. Sick animals should also be isolated, both on their own account and to prevent the spread of disease. This has been done imperfectly, in the only way possible, by keeping them in exposed cages back of the stable and excluding the public. A small building to serve as quarantine and hospital is urgently needed.

Public comfort house.—There is at present no satisfactory provision for the comfort of visitors who come to spend some time in viewing the collection. The park is located at a long distance from any available restaurant, there is no suitable place where women or children can rest, or be quiet if fatigued, or taken suddenly ill. This offers an unpleasant contrast to the arrangements usually seen in other zoological gardens. It is desired to construct a permanent building in a central locality to serve as a rest house and refectory.

New paddocks.—The deer and other ruminant animals confined near the western entrance to the park have worn the ground so much by the constant attrition of their hoofs that their paddocks are almost

wholly bare of vegetation and the soil is washing away under the influence of rains. These animals must soon be removed to a new location.

Alterations of area.—Very soon after the inception of the park endeavors were made to have its boundaries changed to conform to the plan of the city. It must be remembered that this plan was not developed when the park was laid out. Consequently there are regions where the boundary does not reach existing streets and narrow strips of ground are left which, if occupied, make the rear of houses abut upon the park, presenting an unsightly appearance. This has gone on until on the eastern side private houses have been built that seem to be about to slide down a steep cliff into the park. The value of the adjoining property has materially enhanced.

The western side is greatly in need of improvement. The ideal plan would be to extend the park to Connecticut Avenue, which is a fine, broad street, and make the principal entrance there, with gateways befitting a national institution. If this be found to involve too great an expenditure, the area should at least be made to reach to some contiguous road, either now existing or to be hereafter established.

Retaining wall.—The extension of a street a short distance from the southern boundary of the park has made necessary an extensive fill of earth across the ravine where Ontario Road reaches the park boundary. This fill is encroaching more and more upon the park, and after every heavy rain tons of earth are precipitated down this ravine and into the creek. There seems to be no remedy for this but the construction of a suitable retaining wall or walls forming a series of terraces.

Riprapping banks of Rock Creek.—The heavy volume of water that rushes down the creek at every storm erodes the banks, undermines large trees, and in some places threatens the roadways. It is desirable to avoid this by riprapping with stones of sufficient size to withstand the action of the water. Such work can be effectually concealed by planting twigs and small plants in the interstices.

Footbridge below lower ford.—As the city is rapidly increasing to the westward of the park, more and more people enter from Cathedral Avenue. There is a well-made road from this entrance to the ford through the creek, practicable during low water for carriages. Foot passengers are, however, placed at a disadvantage, as in order to reach the animal houses they are obliged to scramble along a precipitous pathway, used at present mainly by workmen, before they can get to the properly improved roads. At a slight expense a footbridge could be made below the lower ford which would enable visitors to reach at once the main roads of the park.

Additions to the collection.—Without attempting to exhibit those animals that are valuable merely because of their variety, it would

seem that a national collection should at least show those that are common objects of interest, such as the giraffe, the dromedary, the rhinoceros, the African elephant, the various mountain goats, including the indigenous species and others. The high price of these animals has made their acquisition prohibitive in the past, but it is hoped their purchase may be made possible in the future.

Respectfully submitted.

FRANK BAKER, *Superintendent.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1912:

EQUIPMENT.

The equipment of the observatory is as follows:

(a) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(b) At Mount Wilson, California, upon a leased plat of ground 100 feet square in horizontal projection are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters.

There were no important additions to the instrument equipment of the observatory during the year.

In 1909 the Smithsonian Institution, at the expense of the Hodgkins fund, erected on the summit of Mount Whitney, California (height 14,502 feet), a stone and steel house to shelter observers who might apply to the Institution for the use of the house to promote investigations in any branch of science. While this structure is not the actual property of the Astrophysical Observatory, it affords an excellent opportunity for observations in connection with those taken on Mount Wilson.

WORK OF THE YEAR.

1. ON THE VARIABILITY OF THE SUN.

Congress having provided funds, an expedition under the immediate charge of the director proceeded in July to Bassour, Algeria, to make there a long series of solar-constant observations simultaneously with similar observations made by Assistant Aldrich on Mount Wilson. The Algerian expedition included Mr. and Mrs. Abbot and Prof. F. P. Brackett, of Pomona College, California. The apparatus carried was the same used by Mr. Abbot on Mount Whitney in 1909

and 1910. Station was reached on July 31, 1911, but owing to a most unfortunate miscarriage of a box of apparatus, observations could not be commenced until August 26, and several more days were required to get the whole outfit working satisfactorily. The weather of August was excellent at both Mount Wilson and Bassour, but in the subsequent months the good days at one station frequently coincided with bad ones at the other. Hence, although 44 days of solar-constant observations were secured at Bassour up to November 17, when the camp was broken up, and a still greater number were secured at Mount Wilson, only 29 of these coincided.

In spite of the loss of August and the unfavorable weather of subsequent months, the results thus far reduced strongly confirm the supposed variability of the sun. For example, the first half of September yielded the following results:

Solar constant values.

	Aug. 29.	Aug. 30.	Aug. 31.	Sept. 1.	Sept. 2.	Sept. 3.	Sept. 4.	Sept. 5.	Sept. 6.	Sept. 7.
Mount Wilson.....	1.913	1.890	1.912	.....	.....	1.894	1.872	1.866	1.935	1.904
Bassour.....	1.976	1.952	1.945	1.930	1.933	1.966	1.905	.....	.....	1.916
B.-W.....	.053	.062	.033	.....	.....	.072	.033	.....	.....	.012

	Sept. 8.	Sept. 9.	Sept. 10.	Sept. 11.	Sept. 12.	Sept. 13.	Sept. 14.	Sept. 15.	Sept. 16.
Mount Wilson.....	1.960	1.945	1.872	1.835	1.865	.....	1.885	1.867	1.890
Bassour.....	.....	2.015	1.860	.....	1.905	1.895	.....	1.885	.....
B.-W.....	.....	.070	-.012	.....	.040	.....	.....	.018	.....

From these results appear:

(A) The solar constant results obtained at Bassour are on the average 2 per cent higher than those obtained for the same days on Mount Wilson. Referring to former reports, the solar constant results obtained at Washington and at Mount Whitney were also consistently higher than those obtained at Mount Wilson, and by about the same amount as just given. Hence, we seem justified in considering that there is a condition tending to low results prevailing at Mount Wilson. This may very probably be the increase of haziness there at high sun, due to increased humidity. In view of the uniform testimony of the three other stations, it seems proper to conclude that Mount Wilson solar constant values are generally too small.

(B) *High solar constant values at Bassour correspond with high solar constant values at Mount Wilson, and vice versa.* This relation is shown in both the accompanying diagrams. Figure 1 is a plot of the successive solar constant values at the two stations for the days mentioned. Figure 2 shows the same values plotted in a manner to

better exhibit the comparison. The vertical scale (fig. 2) represents Mount Wilson values and the horizontal scale Bassour values of the solar constant for each day when satisfactory observations were secured at both stations. If the values observed were without error, it is obvious that for each day they would have been identical at the two stations. Hence, if the solar radiation had values of 1.90, 1.95, and 2 calories on three different days, they should have been represented by points at the lower left corner, the center, and the upper right corner of our diagram, if observed at both stations without

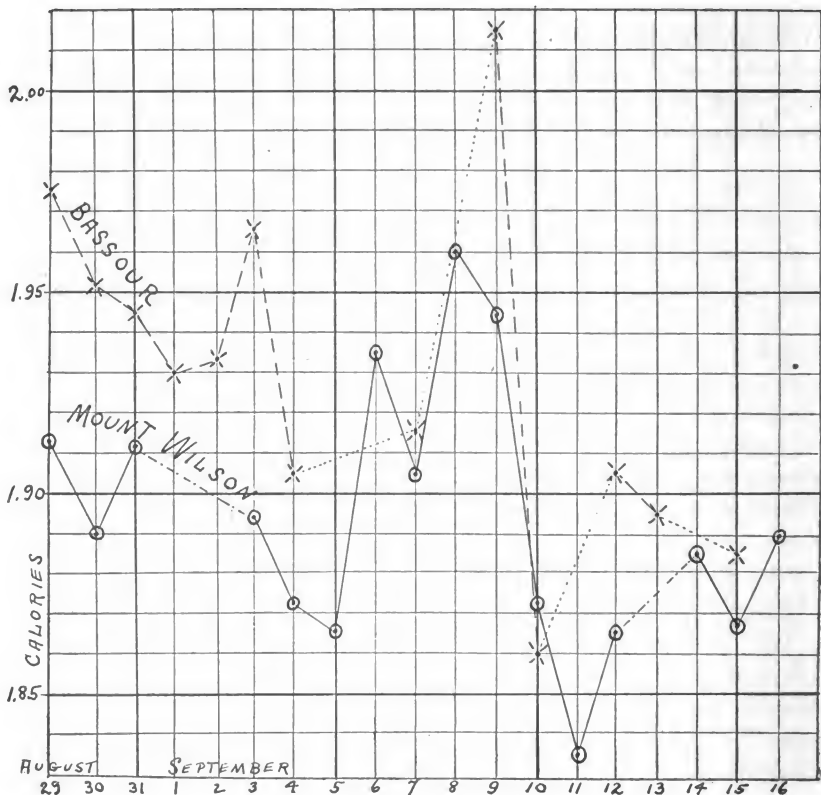


FIG. 1.—Successive solar constant values, Bassour and Mount Wilson.

error. In general all values of the solar constant would fall on the line A B of the figure if the measurements were without error. But we have found the Mount Wilson values consistently lower by 2 per cent. If we admit a constant systematic error of this magnitude, but still deny all accidental error of measurement, then all observations should fall on the line C D of our diagram. They must all lie at a single point of C D if the solar radiation is constant, but may fall anywhere upon that line if the solar radiation is variable. In practice it is of course never possible to avoid accidental errors of

measurement. Hence, we must expect that all values shall cluster about a *point* on C D if the sun is constant, but shall cluster about C D *as an axis* if the sun is variable. The latter condition is evidently the fact. Assuming the mean point of C D as a center, the average deviation from it is proportional to 8. Assuming the line C D as an axis, the average deviation from it is proportional to 3. Thus the observations are represented $8/3$ times better by assuming that the sun's radiation is variable than by assuming it constant.

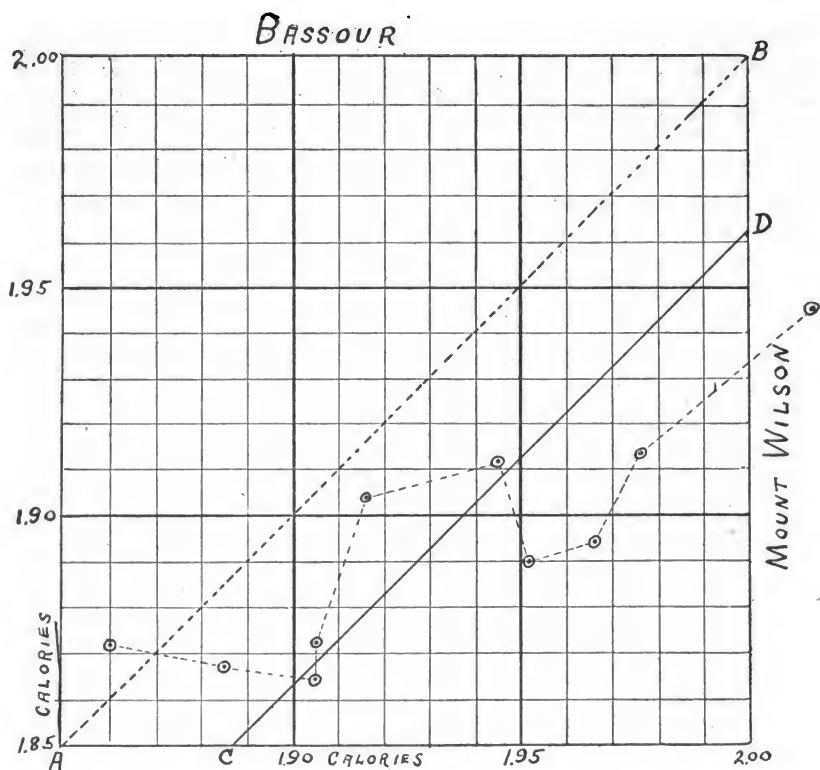


FIG. 2.—Simultaneous solar constant determinations. Bassour and Mount Wilson.

The average deviation of the values from the line C D is 0.021 calories. Hence we may conclude that simultaneous solar constant measurements at Bassour and at Mount Wilson, while differing by a constant factor of 2 per cent, exhibit accidental errors of only 1.2 per cent due to variability of the sky, errors of observing, and the like. Dividing by the square root of 2, we find that the average accidental error of a single solar constant determination at one station is 0.9 per cent. When one considers the multiplicity of the sources of error in this complex investigation, and that the result just announced depends on the uniformity of the sky during several hours, as well as

on the ordinary vicissitudes of all experimental work, the smallness of this accidental error seems remarkable.

Expeditions of 1912.—While the simultaneous observations made in 1911 at Bassour and Mount Wilson seemed justly interpretable as confirming the variability of the sun, yet it was felt that a result of such uncommon interest ought to be put beyond the smallest warrantable doubt. Accordingly, in May, 1912, Mr. and Mrs. Abbot again returned to Bassour, where they were joined on May 20 by Mr. Anders Knutson Ångström, as temporary assistant. Observations were begun on June 2. Observations on Mount Wilson had already been begun by Mr. Fowle in April. June yielded 17 days of measurement at Bassour and 25 days on Mount Wilson. It is expected that the two expeditions will continue observing until about September 10, 1912. There can hardly be any question that this work, combined with that of 1911, will thoroughly prove or disprove the existence of the suspected short-period variations of the sun.

2. ON THE DISSEMINATION OF STANDARDS OF PYRHELIOMETRY.

The Smithsonian Institution having undertaken to furnish silver disk pyrheliometers at cost when useful solar researches seemed likely to be promoted thereby, the assembling of the completed instruments, their standardization, and their packing for shipment have been done at the Astrophysical Observatory. During the past year about 10 such instruments have been prepared and sent out, mostly to foreign governmental meteorological services. When returning from Algeria Mr. Abbot compared silver disk pyrheliometer A. P. O. No. IX at Naples and Potsdam with similar instruments furnished by the Institution. In neither case was there found any change of readings of the instruments compared. It was hoped to make comparisons also at London and Paris, but the weather prevented.

3. ON THE ABSORPTION OF RADIATION BY ATMOSPHERIC WATER VAPOR.

Mr. Fowle has continued the research on the absorption of radiation by water vapor, and has devised and published¹ a method for determining spectroscopically the total quantity of water vapor included between the observer and the sun. The method is based on spectrobolometric observations made with the long absorption tube mentioned in the last two reports, and is applicable to all bolometric observations of the sun's infra-red spectrum. It seems probably to be accurate to within 1 or 2 per cent. Heretofore there has been no method of estimating atmospheric water vapor excepting from observations of the humidity prevailing at the surface of the earth or near kites, balloons, and mountains. From such psychrometric

¹Astrophysical Journal, vol. 35, 1912, p. 149.

observations made at different levels general formulæ for the average humidity of the atmosphere have been derived. Mr. Fowle finds, however, that these formulæ, while representing average conditions, are often widely astray on individual days. He is preparing further data from Washington, Mount Wilson, Mount Whitney, and Bassour spectrobolometric work, to promote a more complete study of atmospheric humidity.

This investigation has yielded a valuable application for solar constant work, for Mr. Fowle has found a way to very greatly shorten the work of correcting for water vapor absorption in reducing the bolographic observations. This will diminish by about one-fifth the labor of reducing the solar constant work, and at the same time will yield results of slightly greater accuracy than before.

Atmospheric water vapor absorption work has been confined to the upper infra-red spectrum bands this year. A vacuum bolometer is in preparation, by means of which a considerable gain in sensitiveness of the apparatus is hoped for. This will greatly promote the value of the work at very great wave lengths, and accordingly this part of the work has been allowed to await the introduction of the vacuum bolometer.

PERSONNEL.

Prof. F. P. Brackett served as temporary bolometric assistant to the Algerian expedition of 1911.

Mr. Anders Knutson Ångström served as temporary bolometric assistant to the Algerian expedition of 1912.

Miss F. E. Frisby was appointed temporary computer, February 12, 1912.

Minor Clerk M. Segal resigned March 1, 1912.

F. R. Carrington was appointed messenger boy on March 25, 1912.

SUMMARY.

The year has been notable for expeditions to Algeria and California to test the supposed variability of the sun by making simultaneously at these two widely separated stations spectrobolometric determinations of the solar constant of radiation. The measurements in Algeria agree with earlier ones at Washington and Mount Whitney and indicate that Mount Wilson values are systematically a little low. Apart from this systematic error the average accidental differences between Algerian and Mount Wilson determinations were only 1.2 per cent, indicating an average accidental error of a single solar constant determination at one station of only 0.9 per cent. So far as yet reduced, *high solar constant values obtained in Algeria coincide with high values at Mount Wilson and vice versa.* A solar

variation of 4 per cent was indicated at both stations in the first half of September, 1911. Many values remain to be computed, but it can now hardly be doubted that the outcome will prove conclusively the irregular short-period variability of the sun.

Numerous copies of the silver disk pyrheliometer have been standardized and sent out, mainly to foreign governmental meteorological services.

Valuable results have been secured in the research on the transmission of radiation through atmospheric water vapor. An accurate method of estimating the total water vapor contents of the atmosphere between the observer and the sun has been devised by Mr. Fowle.

Respectfully submitted.

C. G. ABBOT,

Director, Astrophysical Observatory.

Dr. C. D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to present the following report on the work of the Library of the Smithsonian Institution during the fiscal year ending June 30, 1912:

As no general account of the library has appeared in the publications of the Institution for the last 16 years, it seems desirable to give a brief summary of its history in this place.

The formation of a library was included among the objects of the Institution in the act of Congress approved August 6, 1846, by which it was established. The character of this library was specified in the program of organization presented to the Board of Regents by Secretary Henry on December 8, 1847, and approved by them, in the following terms:

To carry out the plan before described, a library will be required, first, of a complete collection of the transactions and proceedings of all the learned societies in the world; second, of the more important current periodical publications and other works necessary in preparing the periodical reports.

With reference to the collection of books other than those mentioned above, catalogues of all the different libraries in the United States should be procured, in order that the valuable books first purchased may be such as are not to be found in the United States.

Also catalogues of memoirs, and of books in foreign libraries, and other materials should be collected for rendering the Institution a center of bibliographical knowledge, whence the student may be directed to any work which he may require.

In 1847 Prof. Charles C. Jewett was appointed librarian, and after some little delay began collecting books in accordance with the plan just cited. As a result of his activities the Smithsonian Library in 1852 comprised 32,000 volumes. A portion of them was obtained by purchase and others by the exchange of the publications of the Institution for those of learned societies and similar organizations in the United States and in Europe.

The expense of maintaining the library soon became a serious drain on the limited resources of the Institution, and in 1864 the Board of Regents, on the recommendation of Secretary Henry, requested Congress to authorize its deposit in the Library of Congress. An act to this effect was passed in 1866, and, in accordance with its provisions, the Smithsonian library was transferred the same year to the new fireproof rooms in the Capitol which had been prepared at

that time for the better accommodation of the Library of Congress. The Smithsonian Library then contained about 40,000 volumes. Its transfer from the Smithsonian building in nowise checked its growth. It increased in extent with every succeeding year, and in 1895 the record entries had reached 314,500, including books, pamphlets, periodicals and parts of periodicals, and maps, exclusive of certain small special collections not incorporated in the "Smithsonian deposit." The Institution at that time currently received more than 3,045 separate publications of learned societies, periodicals, and magazines, of which 1,565 related to pure science, 704 to applied science, and 776 to art, literature, trade, and a variety of other subjects. The small special collections mentioned above, known as the secretary's library, the office library, the library of the Astrophysical Observatory, the library of the National Zoological Park, the employees' library, the Exchange Service collection, and the law reference library aggregated about 10,000 publications in 1896.

In 1897 the Smithsonian library was transferred with the Library of Congress to the new building provided for the latter and placed in the east stack and in a large room adjoining the same. It was subsequently transferred to another room, which was specially equipped with metal bookcases.

It is not possible to ascertain the exact number of books, pamphlets, and other publications contained in the Smithsonian library at the present time without making an actual enumeration of them, an operation which would be attended by many difficulties. It may be said, however, that at the close of the fiscal year 1912 the accession entries had reached a total for the contents of the library of 508,788, including books, pamphlets, periodicals and parts of periodicals, and maps and charts, exclusive of the small special collections already mentioned.

While the Institution has acquired by donation or otherwise many rare and valuable books and collections of books relating to other subjects than the sciences, the original program laid down by Secretary Henry has been closely followed, and the Smithsonian library deposited in the Library of Congress consists mainly of scientific periodicals and the transactions and proceedings of learned societies. With possibly one exception, it contains the most important collection of these classes of publications to be found anywhere in the world.

The increase in the activities of the National Museum which followed the great influx of collections from the United States Fish Commission and from the Centennial Exhibition of 1876 and the erection of a separate Museum building made it imperative that large numbers of books on natural history, the arts, museum administration, and other subjects should be permanently available for the scientific and administrative staff, for use in identifying and classi-

ying collections and as a source of information regarding museum methods. This resulted in the establishment of the National Museum Library, which had as its nucleus the collection presented by Secretary Baird. By small annual expenditures for the purchase of books, and by the exchange of the Museum publications, by donations, and otherwise, this library has accumulated about 42,000 volumes, 70,000 unbound papers, and a number of maps, charts, and manuscripts.

A similar need in the Bureau of American Ethnology has led to the formation of a library relating to ethnology and archeology, and especially to the North American Indians, which comprises about 21,000 volumes.

While the Library of Congress has the custody of the "Smithsonian deposit," the title of the library remains in the Institution. It continues to have free use of its books, and also enjoys the use of the books belonging to the Library of Congress. Under the provisions of the act of Congress through which the Smithsonian Library was transferred to the Library of Congress, the Institution may withdraw the books upon reimbursement to the Treasury for the expenses incurred in binding and caring for them.

As foreseen by Secretary Henry, this arrangement has both its advantages and its disadvantages. The Institution is relieved from the expense of maintaining a large library, and its books are safeguarded and housed with other similar collections, whereby the wants of students and investigators in many lines of intellectual work are provided for in one place.

On the other hand, the Institution has little within its own walls to show for its early expenditures for books, or for the great system of exchanges which has been carried on for more than half a century. Furthermore, with the growth of the National Museum and other scientific branches, under the direction of the Institution, the desirability of having a large body of books immediately at hand becomes every year more apparent. This is especially true as regards books on natural sciences, and on the industrial and fine arts, a large number of which are constantly needed by the staff of the National Museum, as well as by the other scientific bureaus of the Government and by representatives of the great body of scientific students and investigators throughout the country who are attracted to Washington by the collections of the Museum.

In order that this need might be met as far as possible without impairing the arrangement with the Library of Congress, the Museum has, as already mentioned, assembled a considerable library of its own, but it has been found desirable also to keep certain series belonging to the Smithsonian deposit at the Institution for longer periods than would be required for ordinary reference. The library of the Bureau of Ethnology is also housed in the Smithsonian Building, and, in

addition, the various small collections of books mentioned above, except that of the Zoological Park, which is kept in the park offices.

To provide fireproof quarters for these and also for a portion of the National Museum Library, it was proposed last year to erect metal bookstacks in the main hall of the Smithsonian Building where they could all be brought together and economically administered. It is to be hoped that Congress will soon provide the means for carrying this plan into effect.

As regards the service of the library, the most unsatisfactory feature at present is the delay in obtaining books, which frequently occurs, owing to the fact that, in accordance with the established routine, books are received from the Library of Congress only twice a day. It is not always possible for those who use the library to cite the exact date or serial number of volumes wanted for reference, and hence, through the fault of no one, wrong books are sometimes received. This causes additional delay and dissatisfaction.

As is well known, the plan has recently been canvassed by the Government of connecting the several departments and bureaus by an underground pneumatic carrier large enough to take books of at least the usual sizes. A connection of this kind between the buildings of the Library of Congress, the Smithsonian Institution, and the National Museum would be of great utility in the service of the library and would remove the difficulties now existing as regards the delivery of books.

The greatest defect in the Smithsonian Library, and one which has existed for many years, if not from the beginning, is the lack of completeness of numerous sets of scientific serials. While this condition is not at all peculiar to this library, it is a source of much vexation to those who use the books. Secretary Langley, when in charge of the library, devised a plan by which many gaps were filled, but others still remain. The Institution has never possessed funds sufficient to enable it to remedy the defects by purchase. Odd volumes of a series are not often obtainable, and to purchase the whole, or the greater part of a series, in order to obtain a particular volume, is an expensive procedure. Although a great deal of thought has been expended in attempts to devise a plan to overcome this difficulty, it has not led to any practical result so far as the Institution is concerned. Recently, however, the Library of Congress, through its greater resources, has succeeded in procuring many of the desired volumes, and they have been placed in the gaps in the Smithsonian series. This liberal action in the interest of scientific study seems to constitute the only possible solution of the problem at present, although it would naturally be a source of greater satisfaction to the Institution if all the volumes in the various series bore the Smithsonian stamp.

ACCESSIONS.

During the fiscal year covered by this report, 29,147 packages of publications were received by mail and 2,759 packages through the International Exchange Service, making a total of 31,906 packages. Some of these packages contained as many as 20 separate parts of periodicals or other serial publications. About 4,737 acknowledgments were made on the regular forms in addition to the letters which were written in acknowledgment of publications received in response to the requests of the Institution for exchange.

The accessions for the Smithsonian deposit in the Library of Congress recorded during the year numbered 3,540 volumes, 1,951 parts of volumes, 15,826 pamphlets, and 366 charts, making a total of 21,683 publications. The accession numbers ran from 504,150 to 508,788, the parts of serial publications entered on the card catalogue numbered 19,012, and 1,225 slips were made for completed volumes, and 171 cards for new periodicals. These various publications comprised in all 52,548 separate pieces, including parts of periodicals, pamphlets, and volumes. They were sufficient to fill 364 boxes, which together contained approximately the equivalent of 14,560 volumes. In addition, 2,058 parts of serial publications secured by the Institution in exchange, to complete sets, were also sent to the Library of Congress.

The practice of sending foreign public documents presented to the Institution to the Library of Congress without stamping or entering was continued during the year, about 4,589 publications not included in any of the foregoing statistics having been sent in that manner.

The office library received as accessions 347 volumes, 42 parts of volumes, and 31 pamphlets; the Astrophysical Observatory, 114 volumes, 38 parts of volumes, and 86 pamphlets; and the National Zoological Park 10 volumes and 9 pamphlets, making a total of 677 publications.

EXCHANGES.

Efforts to establish new exchanges and to secure missing parts to complete sets of publications in the Smithsonian Library involved the writing of 3,000 letters, and resulted in the addition of about 171 new periodicals and the receipt of about 2,058 missing parts to complete volumes in the Smithsonian sets.

New exchanges for the annual reports of the American Historical Association from the allotment set aside by agreement for that purpose resulted in the acquisition of a number of publications of historical societies throughout the world. These were added to the Smithsonian deposit in the Library of Congress.

GENERAL WORK ON THE LIBRARY.

As an aid in determining the actual deficiencies in various sets in the Smithsonian deposit in the Library of Congress, a special search was made through the Library of the National Museum for volumes and parts of volumes belonging to the deposit, and it is expected that before the Museum Library is moved into the new building practically all that have lodged there will have been found and sent to the Library of Congress to be entered in the proper records. In addition, requests have been made upon institutions and societies to secure lacking parts, with the result that many sets have been completed. Revised want lists of French and English publications, prepared at the Library of Congress, were examined, and in many cases the publications were supplied by the institutions and societies.

The author catalogue for the general series of publications received was continued, and the results were all that could be desired. Catalogue cards made for the author-donor catalogue numbered 10,012. Publications catalogued comprised 11,194 volumes, 171 new periodicals, and 383 charts. Of the volumes, 1,712 were recatalogued.

During the year 3,731 parts of scientific periodicals and popular magazines and 250 bound volumes were lent to readers, making a total of 3,981.

CATALOGUE OF SMITHSONIAN PUBLICATIONS.

An analytical card catalogue of the publications of the Institution to include both author and subject entries has been begun. Some time will yet be required to complete the task, as the cards under present conditions can be prepared only during intervals in the regular work at the cataloguing and accession desks. Much thought was given to plans for the preparation of a catalogue of Smithsonian publications to be printed in book form, which is greatly needed at the present time, but on account of the limited funds available for printing it was deemed by the secretary inadvisable to undertake the work this year.

READING AND REFERENCE ROOMS.

A rearrangement of the reading rooms, to make more space for readers, is in progress. The accession books are to be placed in a case erected on the west side of the room, the table in the middle of the room is to be reduced in size, one cataloguer's desk is to be transferred to another room, and a table with bins for periodicals is to be placed under the north windows.

The publications in the reference room and those in the reading room are now in charge of one person.

ART ROOM.

The contents of this room were rearranged during the year and publications not directly relating to the fine arts placed in the sectional

libraries of the Museum. A number of books on art belonging to the Marsh collection were placed at the main entrance to the Smithsonian building in conjunction with the newly installed exhibition series illustrating the various activities of the Institution.

EMPLOYEES' LIBRARY.

The total number of loans from this collection made during the year amounted to 1,800. Two hundred and twelve volumes of periodicals were bound and made available for circulation. A number of books, especially selected for the purpose, were sent to the National Zoological Park, as in previous years. Only one book was purchased and one received as a donation.

At the time at which this collection of books was established the facilities for obtaining reading matter of general interest were quite limited, but with the opening of the Washington Public Library they were very greatly increased. In view of the large number of books in all branches of literature which are now available for readers, it does not appear necessary to expend money in extending this special collection.

LIBRARIES OF THE GOVERNMENT BRANCHES.

United States National Museum.—In previous reports reference has been made to the congested condition of the library of the National Museum. This was partly relieved in 1911 by separating out duplicates, for which work temporary assistants were employed for several months. The library still remained somewhat in confusion, however, owing to the necessity of moving various sections from time to time to make room for new accessions. These accessions arrived more rapidly than they could be disposed of, and accumulated in unassorted piles. The library also suffered greatly from dust.

Owing to the necessity of exercising rigid economy in the administration of the Museum library, the present force is scarcely able to do more than keep pace with the current routine work, which consists of registering accessions, entering current numbers of periodicals and transactions of scientific societies in the card-catalogue, classifying new accessions in accordance with the Dewey decimal system, attending to the wants of the readers and those entitled to borrow books, keeping the records of loans, and conducting the necessary correspondence. The very important task of placing books returned by borrowers, or new accessions, on the shelves is performed by the messenger, the classifier, or others, as they have opportunity. The preparation of books for binding, which requires special care, is attended to by the assistant librarian of the Museum in the intervals of other business.

As the time for removing a portion of the library to the new Museum building was approaching, and there seemed no possibility of diverting the regular force to the task of putting the book-stacks in order, the assistant secretary in charge of the Museum, at my suggestion, employed three temporary assistants who overhauled the entire contents of the stacks, thoroughly dusted the shelves and books, gave particular attention to arranging the volumes of the serials in exact order, and to restoring any books that were out of place to their proper locations. At the same time the floors were cleaned and painted to keep down dust, a few new lights were added where needed, and various minor repairs were made to windows, ventilators, etc.

As a result of these activities, the Museum library at the close of the year, though much crowded, presented a clean and orderly appearance throughout, and everything was in train for the transfer of a portion of the books to the new building without confusion or serious interruption of the regular work.

As will be learned from the report of the assistant secretary in charge of the National Museum, a readjustment of exhibits, laboratories, offices, etc., follows from the completion of the new Museum building, and it is the intention to rearrange the library to suit these new conditions. It is proposed to assemble all books on zoology, paleontology, geology, ethnology, and archeology in the new building. Books on the arts and industries, technology, and allied subjects will be assembled in the present library quarters in the old building. Books on botany and those whose contents relate to a number of different subjects will probably also remain for some time in the present quarters, though, as already mentioned, it is hoped that Congress will soon make provision for these and certain Smithsonian books, together with the library of the Bureau of Ethnology, in the main hall of the Smithsonian building.

At the request of the assistant secretary of the Museum, the assistant librarian of the Institution and myself prepared definite plans for the installation of the portion of the library already mentioned in the new Museum building, in well-adapted rooms on the ground floor at the northeast corner. Contracts were made for the metal stacks and other fittings, in accordance with these plans, and at the close of the year they were nearly ready for delivery. It is expected that when this equipment is finished the Museum will have a compact, economical, commodious, well-lighted, and well-arranged library, installed in accordance with the latest and most improved methods.

Many important donations of books were received by this library during the year, and the following officers and associates also presented publications: Dr. Charles D. Walcott, Dr. Theo. N. Gill,

Dr. Edgar A. Mearns, Dr. William H. Dall, Mr. R. Ridgway, Dr. C. W. Richmond, Mr. J. C. Crawford, Dr. O. P. Hay, Dr. A. C. Peale, Mr. W. R. Maxon, and Mr. F. D. Millet.

The Museum library, according to the best statistics available, now contains about 42,000 volumes, 70,000 unbound papers, and 122 manuscripts, besides maps, charts, etc. The accessions during the year consisted of 1,791 books, 3,608 pamphlets, and 276 parts of volumes. During the same period 824 books, 960 complete volumes of periodicals, and 3,622 pamphlets were catalogued.

Attention was given as in previous years to the preparation of volumes for binding. In all 543 books were sent to the Government bindery during the year. The binding is, however, still much in arrears, and it is hoped that more money can be devoted to this purpose in the future. Large numbers of pamphlets need cardboard covers to protect them from injury. Though the covers themselves are available, it is impossible with the present force to bring them into use to the extent required.

During the year 24,815 books, periodicals, and pamphlets were borrowed from the library, among them 5,515 obtained from the Library of Congress and other libraries, and 4,560 were assigned to the sectional libraries of the Museum. The majority of these sectional libraries contain publications that are constantly needed by the several curators and other officers in identifying and classifying material, working up collections for publication, writing exhibition labels, etc., and the books are kept together as long as required, though any of them may be recalled temporarily to the general library for the use of readers. Similar collections of books on museum administration, museum methods, etc., are kept in the offices of the assistant secretary in charge of the Museum, the administrative assistant, the editor, and the superintendent. In all, 31 such sectional libraries are now in existence, one relating to textiles having been added during the year.

The records of the Museum library consist of accession book and an author catalogue, a periodical record, and a lending record in card form. The lending record includes books borrowed from the Library of Congress and from other libraries for the use of the Museum staff.

Correspondence relative to new exchanges and missing parts of serial publications already in the Museum library was carried on as in previous years. A number of new titles were added by this means.

Bureau of American Ethnology.—The report on this library will be made by the ethnologist in charge and incorporated in his general report on the operations of the bureau.

Astrophysical Observatory.—Owing to lack of room in the office of the observatory, a part of the books belonging to this library have

been kept in the Smithsonian building. During the year this latter portion was transferred from one of the tower rooms where it was difficult of access to the southwest gallery in the main hall of the building. Additions, comprising 114 volumes, 38 parts of volumes, and 86 pamphlets, were received during the year.

National Zoological Park.—To this small reference library of zoological publications relating to the work of the park 10 volumes and 9 pamphlets were added during the year.

Summary of accessions.—The following statement summarizes all the accessions for the year, except the Bureau of American Ethnology, which is administered separately:

Smithsonian deposit in the Library of Congress.....	21,683
Smithsonian office, Astrophysical Observatory, National Zoological Park, and International Exchange Service.....	677
United States National Museum.....	5,675
Total.....	28,035

Very respectfully,

F. W. TRUE,
*Assistant Secretary, in charge
of Library and Exchanges.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

OCTOBER 9, 1912.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the year ending June 30, 1912:

The International Catalogue of Scientific Literature is an organization consisting of 32 regional bureaus representing the principal countries of the world. Control over the entire enterprise is vested in an international convention which meets at regular stated intervals. The regional bureaus supply to a central bureau in London classified index citations to the scientific literature published within their several regions.

The duties of the central bureau consist in editing and publishing the citations thus forwarded. The published catalogue comprises 17 annual volumes, one for each of the following-named subjects: Mathematics, mechanics, physics, chemistry, astronomy, meteorology, mineralogy, geology, geography, paleontology, general biology, botany, zoology, anatomy, anthropology, physiology, and bacteriology. Each country cooperating supports its own regional bureau, this support in most cases being in the form of direct governmental grants. The maintenance of the central bureau, which bears the cost of editing and publishing the catalogue, is dependent on the funds received from the sale of the published volumes.

The Royal Society of London has stood financial sponsor for the enterprise since the beginning of the undertaking in 1901, and it has been through the generous financial assistance of this body that the publication of the work has been possible.

The organization has now been at work over 10 years, and the published results have met the exacting requirements of a classified index to the vast scientific activities of the day; but the price of the work to subscribers, although below the cost of publication, is so large that its usefulness is greatly limited. For this reason a permanent endowment is urgently needed in order that the central bureau may have a fixed income independent of the sum derived from the sale of the published volumes. It is believed that if such an endowment could be obtained the cost of the catalogue could be reduced possibly to one-half its present subscription price, which is \$85 per year. This reduction in price would undoubtedly largely increase

the sales, and as a larger edition of the work would cost comparatively little more than the present limited edition any increase in the demand would approximately be clear profit to the central bureau.

This result is not only desirable from a financial standpoint but also because it is believed that this international index to scientific literature, whose scope is now limited to pure science, is but a beginning to what will eventually be an international index to not only the pure but also to the applied sciences. This will mean that the organization will ultimately furnish classified citations to the original literature of many of the professions, arts, and trades whose practices and methods are now much interwoven with, and dependent on the advance of pure science.

The appropriation made by Congress for the maintenance of the regional bureau for the United States during the year was \$7,500, this being the same sum that was appropriated for the previous year. Five persons are regularly employed in this bureau in collecting, indexing, and classifying the scientific literature published in the United States.

The practice of having the more technical scientific papers referred for analysis and classification to specialists in the subjects treated has been found very satisfactory and is now carried on to the exclusion of the former practice of corresponding with the authors of the papers, for it was found that to correspond and advise with authors necessitated much clerical labor and often caused long delays in obtaining the information sought.

During the year 27,201 cards were sent from this bureau to the London central bureau as follows:

Literature of—

1903-----	4
1904-----	243
1905-----	386
1906-----	562
1907-----	1,480
1908-----	1,949
1909-----	3,372
1910-----	5,231
1911-----	13,974
Total-----	27,201

Since the bureau was established in 1901, 262,335 cards have been forwarded to the central bureau.

The following table shows the number of cards sent each year as well as the number of cards representing the literature of each year from 1901 to 1911, inclusive.

Literature of..	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	Total for year
Year ending June 30—												
1902.....	6,990											6,990
1903.....	6,150	8,330										14,480
1904.....	3,044	9,424	8,745									21,213
1905.....	1,619	2,780	11,143	8,640								24,182
1906.....	301	622	3,538	12,139	9,001							25,601
1907.....	384	511	862	5,272	9,022	12,578						28,629
1908.....	408	523	366	956	5,629	7,217	13,429					28,528
1909.....	133	235	373	309	1,656	4,410	8,509	18,784				34,409
1910.....	72	173	248	465	1,163	1,502	3,160	6,305	11,994			25,082
1911.....	3	26	28	218	129	374	423	1,301	8,836	14,682		26,020
1912.....			4	243	386	562	1,480	1,949	3,372	5,231	13,974	27,201
Total...	19,104	22,624	25,307	28,242	26,986	26,643	27,001	28,339	24,202	19,913	13,974	262,335

During this time the London central bureau had received from all of the 32 bureaus cooperating in the production of the International Catalogue a total of 2,059,036 cards, and as 262,335 of these represented the cards received from the United States, it will be seen that about 13 per cent of the work has been done by the regional bureau for the United States. All of the first eight annual issues of the catalogue, consisting of 17 volumes each, have been published, together with 15 volumes of the ninth annual issue and 4 volumes of the tenth annual issue, making a total of 155 volumes of the regular catalogue.

Following an established policy to consolidate the catalogue whenever possible with similar enterprises, an agreement has been made with the International Seismological Association whereby the yearly International Catalogue volume on geology will be enlarged and the section "Internal dynamics," containing an index to seismology, be published not only as a regular part of the International Catalogue, but also separately for the use of the International Seismological Association.

It is a matter of regret that this bureau is not yet able to afford the expense of issuing cards, in advance of the regular published volumes, for the immediate use of persons desiring prompt notice of papers appearing on any of the subjects embraced within the scope of the work. Plans having this object in view have been under consideration for some time, but as yet the necessary funds are not available for the purpose. It is not intended to issue cards in place of annual volumes, but to distribute classified index cards as soon as a paper is published, for the immediate information of those interested in the advance of science.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1912:

The Institution has published one memoir of the "Smithsonian Contributions to Knowledge," 35 papers of the "Smithsonian Miscellaneous Collections," and one annual report. There were also issued by the Bureau of Ethnology 1 annual report and 2 bulletins, and by the United States National Museum 53 miscellaneous papers of the Proceedings, 3 bulletins, and 5 parts of volumes pertaining to the National Herbarium.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

QUARTO.

1948. Langley memoir on mechanical flight. Part I, 1887 to 1896, by Samuel Pierpont Langley, edited by Charles M. Manly. Part II, 1897 to 1903, by Charles M. Manly. Published August 18, 1911. Pages i to x, 320, with 101 plates. Vol. 27, No. 3.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

OCTAVO.

In the series of Smithsonian Miscellaneous Collections there were published (1) 17 papers, cover and preliminary pages for volume 56; (2) 4 papers of volume 57; and (3) 14 papers of volume 59, as follows:

2014. Cambrian geology and paleontology. II. No. 5: Middle Cambrian Annelids. By Charles D. Walcott. Published September 4, 1911. Pages 109 to 144. Plates 18 to 23. Vol. 57, No. 5.

2015. Description of a new genus and species of hummingbird from Panama. By E. W. Nelson. Published July 8, 1911. Pages 2. Vol. 56, No. 21.

2051. Cambrian geology and paleontology. II. No. 6: Middle Cambrian Branchiopoda, Malacostraca, Trilobita, and Merostomata. By Charles D. Walcott. Published March 13, 1912. Pages 145 to 228, with unpagged index. Plates 24 to 34. Vol. 57, No. 6.

2053. Two new subspecies of birds from Panama. By E. W. Nelson. Published September 7, 1911. One page. Vol. 56, No. 22.

2054. On Psomlocarpa, a neglected genus of ferns. By Dr. H. Christ, Basel. Published November 21, 1911. Pages 4. Plate 1. Vol. 56, No. 23.

2055. A remarkable new fern from Panama. By William R. Maxon. Published November 22, 1911. Pages 5. Plates 3. Vol. 56, No. 24.

2056. Descriptions of seven new African grass-warblers of the genus *Cisticola*. By Edgar A. Mearns. Published November 23, 1911. Pages 6. Vol. 56, No. 25.
2058. A new kingfisher from Panama. By E. A. Goldman. Published December 1, 1911. Pages 2. Vol. 56, No. 27.
2059. Description of a new species of sunbird, *Helionympha raineyi*, from British East Africa. By Edgar A. Mearns. Published November 28, 1911. One page. Vol. 56, No. 28.
2062. Four new mammals from the Canadian Rockies. By N. Hollister. Published December 5, 1911. Pages 4. Vol. 56, No. 26.
2064. Three new club mosses from Panama. By William R. Maxon. Published January 6, 1912. Pages 4. Plates 4. Vol. 56, No. 29.
2066. A new subspecies of Ptarmigan from the Aleutian Islands. By A. C. Bent. Published January 6, 1912. Pages 2. Vol. 56, No. 30.
2067. Report on an investigation of the geological structure of the Alps. By Bailey Willis. Published February 7, 1912. Pages 13. Vol. 56, No. 31.
2068. Notes on birds observed during a brief visit to the Aleutian Islands and Bering Sea in 1911. By A. C. Bent. Published February 12, 1912. Pages 29. Vol. 56, No. 32.
2069. Three new plants from Alberta. By Paul C. Standley. Published February 7, 1912. Pages 3. Vol. 56, No. 33.
2070. A new leather flower from Illinois. By Paul C. Standley. Published February 7, 1912. Pages 3. Plate 1. Vol. 56, No. 34.
2071. The natives of Kharga Oasis, Egypt. By Aleš Hrdlička. Published April 15, 1912. Pages 118. Plates 38. Vol. 59, No. 1.
2072. New mammals from Canada, Alaska, and Kamchatka. By N. Hollister. Published February 7, 1912. Pages 8. Plates 3. Vol. 56, No. 35.
2073. Descriptions of twelve new species and subspecies of mammals from Panama. By E. A. Goldman. Published February 19, 1912. Pages 11. Vol. 56, No. 36.
2074. Descriptions of two new species of nun birds from Panama. By E. W. Nelson. Published February 16, 1912. Pages 2. Vol. 56, No. 37.
2075. Cambrian geology and paleontology. II. No. 7: Cambro-Ordovician boundary in British Columbia, with description of fossils. By Charles D. Walcott. Published March 8, 1912. Pages 229 to 237. Plate 35. Vol. 57, No. 7.
2076. Cambrian geology and paleontology. II. No. 8: The Sardinian Cambrian genus *Olenopsis* in America. Published March 8, 1912. Pages 239 to 249. Plate 36. Vol. 57, No. 8.
2077. New species of fossil shells from Panama and Costa Rica. Collected by D. F. MacDonald. By William Healey Dall. Published March 2, 1912. Pages 10. Vol. 59, No. 2.
2078. Description of a new subspecies of monkey from British East Africa. By N. Hollister. Published March 2, 1912. Pages 2. Vol. 59, No. 3.
2079. Descriptions of new genera and species of microlepidoptera from Panama. By August Busck. Published March 9, 1912. Pages 10. Plate 1. Vol. 59, No. 4.
2080. New genus and species of hymenoptera of the family Braconidae from Panama. By H. L. Viereck. Published March 9, 1912. Pages 2. Vol. 59, No. 5.
2081. The genera of fossil whalebone whales allied to Balænoptera. By Frederick W. True. Published April 3, 1912. Pages 8. Vol. 59, No. 6.

2082. Observations on the habits of the crustacean *Emerita analoga*. By Frank Walter Weymouth and Charles Howard Richardson, jr. Published May 10, 1912. Pages 13. Plate 1. Vol. 59, No. 7.
2083. Hamilton lecture. Infection and recovery from infection. By Simon Flexner, M D. Published May 29, 1912. Pages 14. Plates 5. Vol. 59, No. 8.
2085. National Zoological Park. Notes on animals now, or recently, living in the National Zoological Park. By A. B. Baker. Published May 17, 1912. Pages 3. Plate 1. Vol. 59, No. 9.
2086. National Zoological Park. Further notes on the breeding of the American black bear in captivity. By A. B. Baker. Published May 17, 1912. Pages 4. Vol. 59, No. 10.
2088. Sawflies from Panama, with descriptions of new genera and species. By S. A. Rohwer. Published May 18, 1912. Pages 6. Vol. 59, No. 12.
2090. New decapod crustaceans from Panama. By Mary J. Rathbun. Published May 20, 1912. Pages 3. Vol. 59, No. 13.
2091. Smithsonian Miscellaneous Collections. Cover and preliminary pages for volume 56. Pages i to vii.
2092. Report on landshells collected in Peru in 1911 by the Yale expedition under Prof. Hiram Bingham, with descriptions of a new subgenus, a new species, and new varieties. By William Healey Dall. Published June 8, 1912. Pages 12. Vol. 59, No. 14.
2093. Names of the large wolves of northern and western North America. By Gerrit S. Miller, jr. Published June 8, 1912. Pages 5. Vol. 59, No. 15.
- The following papers of the Smithsonian Miscellaneous Collections were in press at the close of the year:
1987. Bibliography of the geology and mineralogy of tin. By Frank L. and Eva Hess. Pages i to v, 408. Vol. 58, No. 2.
2087. Expeditions organized or participated in by the Smithsonian Institution in 1910 and 1911. Pages 51. Plate 1. Figs. 56. Vol. 59, No. 11.
2094. New rodents from British East Africa. By Eldmund Heller. Pages 20. Vol. 59, No. 16.
2133. New diptera from Panama. By J. R. Malloch. Pages 8. Vol. 59, No. 17.
2134. New species of landshells from the Panama Canal Zone. By William H. Dall. Pages 3. Plates 2. Vol. 59, No. 18.

SMITHSONIAN ANNUAL REPORTS.

The Annual Report of the Board of Regents for 1910 was published in January, 1912.

2050. Annual Report of the Board of Regents of the Smithsonian Institution, showing operations, expenditures, and conditions of the Institution for the year ending June 30, 1910. Octavo. Pages i to vii, 688. Plates 129 and 1 map. Containing publications 2001, 2002, and 2016-2049.

Small editions of the following papers, forming the general appendix of the Annual Report of the Board of Regents for 1910, were issued in pamphlet form:

2016. Melville Weston Fuller, 1833-1910, by Charles D. Walcott. Pages 113-123, with 1 plate.
2017. Ornamentation of rugs and carpets, by Alan S. Cole. Pages 125-144, with 6 plates.

2018. Recent progress in aviation, by Octave Chanute. Pages 145-167, with 19 plates.
2019. Progress in reclamation of arid lands in the western United States, by F. H. Newell. Pages 169-198, with 12 plates.
2020. Electric power from the Mississippi River, by Chester M. Clark. Pages 199-210, with 8 plates.
2021. Safety provisions in the United States Steel Corporation, by David S. Beyer. Pages 211-229, with 11 plates.
2022. The insolation of an ion, a precision measurement of its charge, and the correction of Stokes's Law, by R. A. Millikan. Pages 231-356.
2023. The telegraphy of photographs, wireless and by wire, by T. Thorne Baker. Pages 357-274, with 2 plates.
2024. Modern ideas on the constitution of matter, by Jean Becquerel. Pages 275-290.
2025. Some modern developments in methods of testing explosives, by Charles E. Munroe. Pages 291-306, with 12 plates.
2026. Sir William Huggins, by W. W. Campbell. Pages 307-317, with 1 plate.
2027. The solar constant of radiation, by C. G. Abbot. Pages 319-328.
2028. Astronomical problems of the Southern Hemisphere, by Heber D. Curtis. Pages 329-340.
2029. The progressive disclosure of the entire atmosphere of the sun, by Dr. H. Deslandres. Pages 341-356, with 4 plates.
2030. Recent progress in astrophysics in the United States, by J. Bosler. Pages 357-370, with 8 plates.
2031. The future habitability of the earth, by Thomas Chrowder Chamberlin. Pages 371-389.
2032. What is terra firma? A review of current research in isostasy, by Bailey Willis. Pages 391-406, with 3 plates.
2033. Transpiration and the ascent of sap, by Henry H. Dixon. Pages 407-425.
2034. The sacred ear-flower of the Aztecs, by William Edwin Safford. Pages 427-431, with 1 plate.
2035. Forest preservation, by Henry S. Graves. Pages 433-445, with 7 plates.
2036. Alexander Agassiz, 1835-1910, by Alfred Goldsborough Mayer. Pages 447-472, with 1 plate.
2037. Recent work on the determination of sex, by Leonard Doncaster. Pages 473-485.
2038. The significance of the pulse rate in vertebrate animals, by Florence Buchanan. Pages 487-505.
2039. The natural history of the solitary wasps of the genus *Synagris*, by E. Roubaud. Pages 507-525, with 4 plates.
2040. A contribution to the ecology of the adult *Hoatzin*, by C. William Beebe. Pages 527-543, with 7 plates.
2041. Migration of the Pacific plover to and from the Hawaiian Islands, by Henry W. Henshaw. Pages 545-559.
2042. The plumages of the ostrich, by Prof. J. E. Duerden. Pages 561-571, with 8 plates.
2043. Manifested life of tissues outside of the organism, by Alexis Carrel and Montrose T. Burrows. Pages 573-582.
2044. The origin of Druidism, by Julius Pokorny. Pages 583-597.
2045. Geographical and statistical view of the contemporary Slav peoples, by Lubor Niederle. Pages 599-612, with colored map.
2046. The cave dwellings of the Old and New Worlds, by J. Walter Fewkes. Pages 613-634, with 11 plates.

2047. The origin of West African crossbows, by Henry Balfour. Pages 635-650, with 1 plate.
 2048. Sanitation on farms, by Allen W. Freeman. Pages 651-657.
 2049. Epidemiology of tuberculosis, by Robert Koch. Pages 659-674.

The report of the executive committee and Proceedings of the Board of Regents of the Institution, as well as the report of the secretary, for the fiscal year ending June 30, 1911, both forming part of the annual report of the Board of Regents to Congress, were published in pamphlet form in December, 1911, as follows:

2061. Report of the executive committee and Proceedings of the Board of Regents for the year ending June 30, 1911. Pages 19.
 2065. Report of the secretary of the Smithsonian Institution for the year ending June 30, 1911. Pages 91.

The general appendix to the Smithsonian Report for 1911 was in type, but actual presswork could not be completed before the close of the fiscal year. In the general appendix are the following papers:

The gyrostatic compass, by H. Marchand.

Radiotelegraphy, by G. Marconi.

Multiplex telephony and telegraphy by means of electric waves guided by wires, by George O. Squier.

Recent experiments with invisible light, by R. W. Wood.

What electrochemistry is accomplishing, by Joseph W. Richards.

Ancient and modern views regarding the chemical elements, by William Ramsay.

The fundamental properties of the elements, by Theodore William Richards.

The production and identification of artificial precious stones, by Noel Heaton.

The sterilization of drinking water by ultra-violet radiations, by Jules Courmont.

The legal time in various countries, by M. Philippot.

Some recent interesting developments in astronomy, by J. S. Plaskett.

The age of the earth, by J. Joly.

International air map and aeronautical marks, by Ch. Lallemand.

Geologic work of ants in tropical America, by J. C. Branner.

On the value of the fossil floras of the arctic regions as evidence of geological climates, by A. G. Nathorst.

Recent advances in our knowledge of the production of light by living organisms, by F. Alex. McDermott.

Organic evolution; Darwinian and de Vriesian, by N. C. Macnamara.

Magnalia naturæ: or the greater problems of biology, by D'Arcy Wentworth Thompson.

A history of certain great horned owls, by Charles R. Keyes.

The passenger pigeon, by Pehr Kalm (1759), and John James Audubon (1831).

Note on the iridescent colors of birds and insects, by A. Mallock.

On the positions assumed by birds in flight, by Bentley Beetham.

The garden of serpents, Butantan, Brazil, by S. Pozzi.

Some useful native plants from New Mexico, by Paul C. Standley.

The tree ferns of North America, by William R. Maxon.

The value of ancient Mexican manuscripts in the study of the general development of writing, by Alfred M. Tozzer.

The discoverers of the art of iron manufacture, by W. Belck.
 The Kabyles of north Africa, by A. Lissauer.
 Chinese architecture and its relation to Chinese culture, by Ernst Boerschmann.
 The Lolos of Kientchang, western China, by A. F. Legendre.
 The physiology of sleep, by R. Legendre.
 Profitable and fruitless lines of endeavor in public health work, by Edwin O. Jordan.
 Factory sanitation and efficiency, by C.-E. A. Winslow.
 The physiological influence of ozone, by Leonard Hill and Martin Flack.
 Traveling at high speeds on the surface of the earth and above it, by H. S. Hele-Shaw.
 Robert Koch, 1843-1910, by C. J. M.
 Sir Joseph Dalton Hooker, 1817-1911, by Lieut. Col. D. Prain.

SPECIAL PUBLICATIONS.

The following special publications were issued in octavo form, during the year:

- 2013. Opinions rendered by the International Commission on Zoological Nomenclature. Opinions 30-37. Published July, 1911. Pages 69-88.
- 2060. Opinions rendered by the International Commission on Zoological Nomenclature. Opinions 38-51. Published February, 1912. Pages 89-117.
- 2052. Classified list of Smithsonian Publications available for distribution, January, 1912. Published January, 1912. Pages vi, 29.
- 2084. Publications of the Smithsonian Institution issued between January 1, and April 1, 1912. One page.
- A. single folder, containing map showing Smithsonian and National Museum buildings, and information pertaining thereto.

There were no special publications in press at the close of the year.

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (a) The annual report to Congress; (b) the proceedings of the United States National Museum, and (c) the Bulletin of the United States National Museum, which includes the contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

The publications issued by the National Museum during the year comprised the annual report for 1911; papers 1848, 1853, 1856 to 1879 of volume 41, Proceedings; papers 1880 to 1906 of volume 42, Proceedings; three bulletins and five parts of Contributions from the National Herbarium.

The bulletins were as follows:

- No. 50, Part 5. Birds of North and Middle America, by Robert Ridgway.
- No. 77. The early Paleozoic Bryozoa of the Baltic Provinces, by Ray S. Bassler.
- No. 78. Catalogue of a selection of art objects from the Freer Collection exhibited in the new building of the National Museum.

In the series of Contributions from the National Herbarium (octavo) there appeared:

- Vol. 13, Part 11. The Alliaceæ of Mexico and Central America, by Paul Standley.
- Vol. 13, Part 12. New or noteworthy plants from Columbia and Central America, by Henry Pittier.
- Vol. 14, Part 3. The Gramæ grasses: Bouteloua and related genera, by David Griffiths.
- Vol. 16, Part 1. Miscellaneous papers, by William R. Maxon, J. N. Rose, Paul Standley, and R. S. Williams.
- Vol. 16, Part 2. Studies of Tropical American Ferns, by William R. Maxon.

There were also published in completed form volumes 39, 40, and 41 of Proceedings, and a new edition of Bulletin 39, Part N.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY

The publications of the bureau are discussed elsewhere in the Secretary's report. The editorial work is in the charge of Mr. J. G. Gurley.

One annual report and two bulletins were issued during the year, as follows:

- Twenty-seventh Annual Report, comprising the administrative report for the year ending June 30, 1906, and a paper entitled "The Omaha Tribe," by Alice C. Fletcher and Francis La Flesche. Published 1911. Royal octavo. Pages 1 to 672, with 65 plates and 132 figures.
- Bulletin 47. A dictionary of the Biloxi and Ofo Languages, with thirty-one Biloxi texts and numerous Biloxi phrases, by James Owen Dorsey and John R. Swanton. Published 1912. Octavo. Pages i to v, 340.
- Bulletin 49. List of publications of the Bureau of American Ethnology. Published 1911. Octavo. Pages 1 to 34.

PUBLICATIONS OF THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY.

There were no new publications issued by the Astrophysical Observatory during the year.

PUBLICATIONS OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution, and are communicated to Congress under the provisions of the act of incorporation of the association.

Volume 2 of the annual report for 1908, sent to the printer April 26, 1910, was published during the past fiscal year. On account of the size of the work it was issued in two parts, pages 1 to 807, and 808 to 1617, and comprised Parts II and III of Texas Diplomatic Correspondence, edited by the late Prof. George P. Garrison.

There was also published the annual report for 1909, with the following contents:

1. Report of the proceedings of the twenty-fifth annual meeting of the American Historical Association, by Waldo G. Leland, secretary.
2. Twenty-fifth anniversary celebration: Proceedings of the Carnegie Hall meeting.
3. Report of the proceedings of the sixth annual meeting of the Pacific coast branch, by Jacob N. Bowman, secretary of the branch.
4. Western Asia in the reign of Sennacherib of Assyria (705-689), by Albert T. Olmstead.
5. The teaching of mediæval archæology, by Camille Enlart.
6. Paradoxes of Gladstone's popularity, by Edward Porritt.
7. Bismarck as historiographer, by Guy Stanton Ford.
8. Some aspects of postal extension into the West, by Julian P. Bretz.
9. Side lights on the Missouri compromise, by Frank Heywood Hodder.
10. Two studies in the history of the Pacific Northwest, by Edmond S. Meany:
 1. The towns of the Pacific Northwest were not founded on the fur trade.
 2. Morton Matthew McCarver, frontier city builder.
11. The place of the German element in American history, by Julius Goebel.
12. The Dutch element in American history, by H. T. Colenbrander.
13. The Dutch element in the United States, by Ruth Putnam.
14. Report of the conference on the contribution of the Romance nations to the history of America, by William R. Shepherd.
15. Historical societies in Great Britain, by George W. Prothero.
16. The work of Dutch historical societies, by H. T. Colenbrander.
17. The historical societies of France, by Camille Enlart.
18. The work of historical societies in Spain, by Rafael Altamira.
19. Proceedings of the sixth annual conference of historical societies, by Waldo G. Leland.
20. Tenth annual report of the public archives commission.
 - Appendix A. Proceedings of the first annual conference of archivists.
 - Appendix B. Report on the archives of the State of Illinois, by C. W. Alvord and T. C. Pease.
 - Appendix C. Report on the archives of New Mexico, by J. H. Vaughan.
21. Writings on American history, 1909, by Grace G. Griffin.

The manuscript of volume 1 of the annual report for 1910 was sent to the printer June 2, 1911.

PUBLICATIONS OF THE SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Fourteenth Annual Report of the National Society of the Daughters of the American Revolution, for the year ending October 11, 1911, was communicated to Congress February 26, 1912.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee

have been referred the manuscripts proposed for publication by the various branches of the Institution, as well as those offered for printing in the Smithsonian Miscellaneous Collections. The committee also considered forms of routine blanks and various matters pertaining to printing and publication, including the qualities of paper suitable for text and plates. Twenty-one meetings were held and 156 manuscripts were acted upon.

Respectfully submitted.

A. HOWARD CLARK, *Editor*.

Dr. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.



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Report of the secretary

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LOWER LEVEL STORAGE

the same time, the *Chrysomelidae* are the most numerous and the *Curculionidae* are the most diverse.

It is interesting to note that the *Curculionidae* are the most numerous in the *Chrysomelidae* and the *Chrysomelidae* are the most numerous in the *Curculionidae*. This is a reciprocal relationship which is not found in any other group of insects. The *Curculionidae* are the most numerous in the *Chrysomelidae* and the *Chrysomelidae* are the most numerous in the *Curculionidae*. This is a reciprocal relationship which is not found in any other group of insects.

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